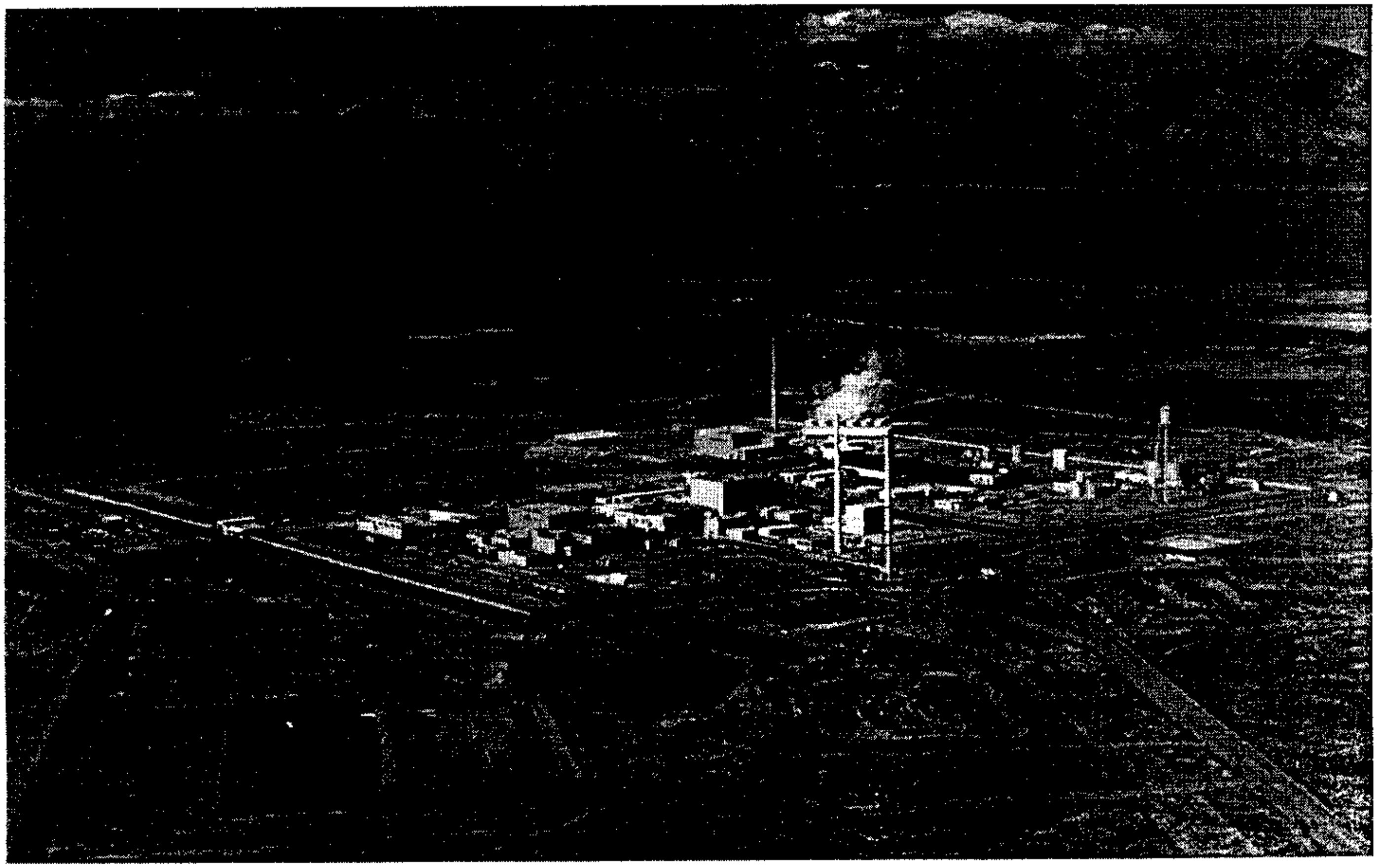
Idaho National Engineering Laboratory

IDAHO DEPARTMENT OF HEALTH AND WELFARE

DIVISION OF ENVIRONMENTAL QUALITY

Final Record of Decision

Test Reactor Area



Operable Unit 2-13
Idaho National Engineering and Environmental Laboratory
Idaho Falls, Idaho

DOE/ID-10586

Record of Decision
Test Reactor Area

December 22, 1997

Operable Unit 2-13
Idaho National Engineering and Environmental Laboratory
Idaho Falls, Idaho

DECLARATION OF THE RECORD OF DECISION

Site Name and Location

Test Reactor Area, Waste Area Group 2
Operable Unit 2-13
Idaho National Engineering and Environmental Laboratory
Idaho Falls, Idaho

Statement of Basis and Purpose

The Test Reactor Area (TRA) Waste Area Group (WAG) 2 is one of the ten Idaho National Engineering and Environmental Laboratory (INEEL) WAGs identified in the Federal Facilities Agreement and Consent Order (FFA/CO) by the U.S. Environmental Protection Agency (EPA) Region 10, the Idaho Department of Health and Welfare (IDHW), and the U.S. Department of Energy (DOE). Operable Unit (OU) 2-13 is listed as the "WAG 2 Comprehensive Remedial Investigation (RI)/Feasibility Study (FS), including TRA Chemical Waste Pond" in the FFA/CO. The RI/FS task was to assemble the investigations previously conducted for WAG 2, to thoroughly investigate the sites not previously evaluated, and to determine the overall risk posed by the WAG. This resulting comprehensive Record of Decision (ROD) document presents the selected remedial actions for eight contaminant release sites at the TRA of the INEEL, Idaho Falls, Idaho. It provides information to support remedial actions for these eight sites where contamination presents an unacceptable risk, and a "No Action" decision on 47 additional sites at the TRA. These remedial actions have been chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1986, as amended by the Superfund Amendments and Reauthorization Act, and to the extent practicable, with the National Oil and Hazardous Substances Pollution Contingency Plan. It is also designed to satisfy the requirements of the FFA/CO. This decision is based on the administrative record for the site.

The DOE is the lead agency for this decision. The EPA and the IDHW have participated in the evaluation of the final action alternatives. The EPA and IDHW both concur with the selection of the preferred remedy for the TRA eight sites of concern and with the No Action determinations for the remaining sites.

Assessment of the Site

Eight of the 55 identified release sites within TRA have actual or threatened releases of hazardous substances, which, if not addressed by implementing the response actions selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment. These sites include four disposal ponds [Warm Waste Pond—1952, 1957, and 1964 cells (TRA-03), Chemical Waste Pond (TRA-06), Cold Waste Pond (TRA-08), and the Sewage Leach Pond (TRA-13)], three subsurface contaminant release sites [soil surrounding Hot Waste Tanks at Building 613 (TRA-15), Tanks 1 and 2 at Building 630 [(TRA-19), and the Brass Cap Area], and one area of surficial windblown contamination (Sewage Leach Pond Berms and Soil Contamination Area). The response actions selected in this ROD are designed to reduce the potential threats to human health and the environment to acceptable levels. The remaining 47 sites as part of the following OUs either were determined not to present an unacceptable risk to human health or the environment, and therefore require no further action, or were part of a previous ROD. These OUs are: Rubble Piles (no OU specified), Paint Shop Ditch (OU 2-01); Inactive Fuel Tanks (OU 2-02); Miscellaneous Spill Sites (OU 2-03); Petroleum and Polychlorinated Biphenyl Sites and the North Storage Area including the North Storage Area, Soil Contamination Area (OU 2-04); Hot Waste Tanks (OU 2-05); Rubble Sites (OU 2-06); Cooling Tower Sites (OU 2-07); Materials Test Reactor Canal (OU 2-08); Sewage Treatment Plant (OU 2-09); Retention Basin, Injection Well, Cold Waste Sampling Pit and Sump (OU 2-11); Perched Water (OU 2-12); and Hot Tree Site, Engineering Test Reactor Stack, French Drain Associated with TRA-653 and Diesel Unloading Pit (OU 2-13) .

Description of the Selected Remedies

The selected remedy for the Warm Waste Pond (TRA-03), 1952 and 1957 cells, is containment of the pond contents using an engineered cover consisting of several layers of geologic materials to reduce potential exposure to contaminated pond sediments by human and environmental receptors. This remedy also includes the following institutional controls that are assumed to remain in effect for at least 100 years: long-term environmental monitoring, soil cover integrity monitoring and maintenance, surface water diversions, and access restrictions (e.g., fencing and signage). Before cover construction, the Warm Waste Pond 1957 cell may be filled to grade with bulk CERCLA-contaminated soils from the INEEL. For the Warm Waste Pond 1964 cell, where an interim remedial action was previously completed, a riprap or cobble gravel layer will be placed over the existing native soil cover to inhibit future intrusion or excavation and to increase the degree of permanence of the remedy. In addition, institutional controls as described above will be implemented for the Warm Waste Pond 1964 cell.

The major components of the selected remedy for the Warm Waste Pond are:

- Containment by cover, with an engineered cover constructed primarily of native materials

- Implementation may include consolidation of INEEL CERCLA-generated contaminated materials similar to those already in the Warm Waste Pond for containment under the 1957 cell engineered cover

- Implementation will include consolidation of clean native soil from an appropriate borrow source located at the INEEL

- Contouring and grading of surrounding terrain to direct surface water runoff away from the covers

- Periodic aboveground radiological surveys following completion of the covers to assess the effectiveness of the remedial action

- Periodic inspection and maintenance following completion of the covers to ensure cover integrity and surface drainage away from the covers

- Access restrictions consisting of fences, posted signs, and permanent markers

- Restrictions limiting land use for at least 100 years following completion of the covers

- Review of the remedy no less than every 5 years until determined by the regulatory agencies to be unnecessary.

The selected remedy addresses the principal risks posed by the Warm Waste Pond by providing shielding from ionizing radiation, a cover to inhibit ecological and human intrusion, and a long-lasting cover to diminish the effects of wind and water erosion.

The selected remedy of the Chemical Waste Pond (TRA-06) is containment with a native soil cover and institutional controls with possible excavation, treatment, and disposal after sampling. This remedy will provide a sufficient thickness of soil to effectively reduce the potential for human and/or biological intrusion or excavation into the contamination.

The EPA's preference for sites that pose relatively low long-term threats or where treatment is impractical (e.g., TRA radionuclide contamination) is engineering controls, such as containment. In the case of low-level mercury contamination in the Chemical Waste Pond, containment is a protective and cost-effective option to remediate the exposure pathway (homegrown food crop ingestion) determined to pose an unacceptable risk. Based on sampling to be conducted during the remedial design phase to determine the nature and extent of contamination, remediation of the Chemical Waste Pond may include excavation, treatment, and disposal prior to containment with a native soil cover.

A revised cost comparison based on the above-identified sampling will be reviewed by the agencies during the Remedial Design Phase.

The major components of the selected remedy for the Chemical Waste Pond are:

- Containment with a soil cover constructed primarily of native materials
- Implementation will include consolidation of clean native soil from the berms surrounding the Chemical Waste Pond and from an appropriate borrow source located at the INEEL
- Contouring and grading of surrounding terrain to direct surface water runoff away from the cover
- Final cover layer materials will be determined in the Remedial Design/Remedial Action Work Plan but may include a vegetated crested wheatgrass and a gravel mulch layer
- Periodic inspection and maintenance following completion of the cover to ensure integrity and surface drainage away from the cover
- Access restrictions consisting of fences, posted signs, and permanent markers
- Restrictions limiting land use for at least 100 years following completion of the cover
- Review of the remedy no less than every 5 years until determined by the regulatory agencies to be unnecessary.

The selected remedy addresses the principal risks posed by the Chemical Waste Pond by isolating the contaminants, providing institutional controls to inhibit human intrusion, and a long-lasting cover to inhibit the effects of wind and water erosion.

The selected remedy for the Sewage Leach Pond is containment using a native soil cover and institutional controls as described above. This remedy will provide a sufficient thickness of soil to effectively reduce the potential for intrusion or excavation into the contaminated area and will provide shielding against exposure to radionuclide contamination. Prior to placement of the final clean soil cover, contaminated soil will be removed from the sewage leach pond berms for placement in the bottom of the Sewage Leach Pond. The berms of the pond will then be placed into the pond to ensure that any contaminated soil is contained. Additional fill material will be used, as needed, to bring the ponds to grade.

The major components of the selected remedy for the Sewage Leach Pond are:

- Containment by capping with a native soil cover constructed primarily of native materials

- Contaminated soil from the berms will be placed in the bottom of the Sewage Leach Pond cells

- Implementation will include consolidation of soil from the berms surrounding the Sewage Leach Pond and from an appropriate borrow source located at the INEEL

- Contouring and grading of surrounding terrain to direct surface water runoff away from the cover

- Final cover layer materials will be determined in the Remedial Design/Remedial Action Work Plan but may include a vegetated crested wheatgrass and a gravel mulch layer

- Periodic aboveground radiological surveys following completion of the cover to assess the effectiveness of the remedial action

- Periodic inspection and maintenance following completion of the cover to ensure cover integrity and surface drainage away from the cover

- Access restrictions consisting of fences, posted signs, and permanent markers

- Restrictions limiting land use for at least 100 years following completion of the cover

- Review of the remedy no less than every 5 years until determined by the regulatory agencies to be unnecessary.

The selected remedy addresses the principal risks posed by the Sewage Leach Pond by providing shielding from ionizing radiation, institutional controls to inhibit human intrusion, and a long-lasting cover to diminish the effects of wind and water erosion.

For the Cold Waste Pond (TRA-08), the selected alternative is excavation followed by disposal at an appropriate facility. Additional field and laboratory data will be obtained beforehand to optimize excavation activities. Current administrative controls designed to protect worker health and safety will be maintained.

The major components of the selected remedy for the Cold Waste Pond are:

- Sampling to identify hot spots
- Excavation of hot spots that are above acceptable levels
- Disposal at an appropriate location (e.g., Warm Waste Pond, 1957 cell).

The selected remedy addresses the principal risks posed by the Cold Waste Pond by effectively removing the source of contamination and thus breaking the pathway by which a future receptor may be exposed.

The selected remedy for the Soil Surrounding Hot Waste Tanks at Building 613 (TRA-15) is Limited Action, consisting of continued use of existing administrative controls and implementation of long-term environmental monitoring for a period of at least 100 years to protect current and future occupational receptors. On the basis of predicted radioactive decay, no further action is expected at the end of 100 years. Five-year reviews would be conducted to ensure that the remedy remains protective for the entire period of administrative controls.

Major components of the selected remedy for TRA-15 are:

- Inspection of existing operational controls to assess the adequacy and need for additional institutional controls
- Access restrictions (e.g., fences, posted signs, and permanent markers)
- Restrictions limiting land use for at least 100 years
- Periodic inspection and maintenance to ensure integrity of institutional controls
- Review of the remedy no less than every 5 years until determined by the regulatory agencies to be unnecessary.

The selected remedy addresses the principal risks posed by the Soil Surrounding Hot Waste Tanks at Building 613 by effectively preventing access to the area and exposure to contaminated media.

For the Soil Surrounding Tanks 1 and 2 at Building 630 (TRA-19) and the Brass Cap Area, the selected alternative is Limited Action, with the contingency that, when controls established under the Limited Action are not maintained, then an excavation and disposal option would be implemented (to a maximum of 10 ft). This Limited Action alternative is preferred because the contamination associated with these two sites is located under the ground surface in and around active radioactive waste piping and tank systems and buildings where access is physically limited. Therefore, excavation alternatives are not fully implementable at this time, because it cannot be ensured that adequate contamination could be removed to eliminate the need for the controls that would be in place under the Limited Action alternative.

If during 5-year reviews it is determined that the controls established under the Limited Action alternative could not be maintained or do not continue to be protective, then the contingency of excavation and disposal would be implemented. Selection of the Limited Action alternative requires that existing administrative controls, such as access restrictions and worker protection programs, be maintained to prevent exposure to workers or future inhabitants above acceptable levels and long-term environmental monitoring to be implemented.

Major components of the selected remedy for TRA-19 and the Brass Cap Area are:

- Inspection of existing operational controls to assess the adequacy and need for additional institutional controls
- Access restrictions (e.g., fences, posted signs, and permanent markers)
- Restrictions limiting land use for at least 100 years
- Periodic inspection and maintenance to ensure integrity of institutional controls
- Review of the remedy no less than every 5 years, until determined by the agencies to be unnecessary
- Once controls established under the limited action are not maintained (no longer than 100 years) or do not continue to be protective, then excavation and disposal of contaminated soil will be implemented.

The selected remedy addresses the principal risks posed by the Soil Surrounding Tanks 1 and 2 at Building 630 (TRA-19) and the Brass Cap Area by effectively preventing access to the area so that exposure to contaminated media resulting in an unacceptable risk to human health and the environment would not be possible. In addition, if controls established under the Limited Action were not maintained, then excavation and removal of contaminated media would effectively remove the source of contamination and thus break the pathway by which future receptors may be exposed.

The identification of Limited Action as the preferred alternative with an excavation and disposal contingency is based on the 100-year industrial land use assumption for TRA. The validity of this assumption will be evaluated during the 5-year review process. However, the maximum duration of time for which this assumption may be considered valid is up to 100 years from the signing of this ROD.

For the Sewage Leach Pond Berms and Soil Contamination Area, the selected remedy is Limited Action (existing administrative/institutional controls, including implementation of long-term environmental monitoring) for a period of at least 100 years to protect current and future occupational receptors. However, through radioactive decay, it is estimated that no further action would be needed at the end of the 100-year period. Consistent with the Sewage Leach Pond remedy, however, the windblown radionuclide-contaminated soil berms will be placed in the bottom of the pond as part of the native soil cover. This remedy will continue to prevent or reduce potential occupational exposure to acceptable levels for the 100-year period that institutional controls are in place. The 5-year review process would be used to ensure that the remedy remains effective.

Major components of the selected remedy for Sewage Leach Pond Berms and Soil Contamination Area are:

- Inspection of existing operational controls to assess the adequacy and need for additional institutional controls

- Access restrictions (e.g., fences, posted signs, and permanent markers)

- Restrictions limiting land use for at least 100 years

- Periodic inspection and maintenance to ensure integrity of institutional controls

- Review of the remedy no less than every 5 years until determined by the agencies to be unnecessary.

The selected remedy addresses the principal risks posed by the Sewage Leach Pond Berms and Soil Contamination Area by effectively preventing access to the area so that exposure to contaminated media would result in an unacceptable risk to human health and the environment while radioactive decay occurs.

For the Snake River Plain Aquifer and the Deep Perched Water System, the OU 2-12 ROD remains in place. The Warm Waste Pond, which was the major source of contamination in the perched groundwater, has been replaced by a new lined pond. A monitoring plan will be developed in accordance with the OU 2-13 Remedial Design/Remedial Action Scope of Work, which integrates the monitoring needs of both OU 2-12 and OU 2-13. Until that time, monitoring will continue to be performed as prescribed in the OU 2-12 monitoring plan. Groundwater monitoring will be conducted to verify that contaminant concentration trends follow those predicted by the groundwater model. Computer modeling shows that through natural radioactive decay, natural attenuation, and dispersion, contaminants in the groundwater will steadily decrease to acceptable levels within the next 20 years, which is consistent with the time of continued operations at the TRA. Existing institutional controls, which include land use and property access restrictions, will continue to be maintained. The CERCLA 5-year review process will be used to verify that this recommendation remains protective.

The No Action alternative is reaffirmed and selected as the appropriate alternative for the remaining 47 sites at the TRA on the basis of risks being at an acceptable level or due to the lack of known or suspected contaminant releases to the environment.

The possibility exists that contaminated environmental media not identified by the INEEL FFA/CO or in this comprehensive investigation will be discovered in the future as a result of routine operations, maintenance activities, and decontamination and dismantlement activities at TRA. Upon discovery of a new contaminant source by DOE, IDHW, or EPA, that contaminant source will be evaluated and appropriate response action taken in accordance with the FFA/CO. In addition, legacy waste that has been generated as a result of previous sampling activities at WAG 2 (i.e., investigation derived waste) will be appropriately characterized, assessed, and dispositioned in accordance with regulatory requirements to achieve remediation goals consistent with remedies established for sites under this ROD.

Statutory Determination

The selected remedy for each site has been determined to be protective of human health and the environment, to comply with federal and state requirements that are legally applicable or relevant and appropriate (applicable or relevant and appropriate requirements to the remedial actions), and to be cost effective.

These remedies use permanent solutions and alternative treatment technologies to the maximum extent practicable. However, because treatment of radionuclide-contaminated soil is not found to be practical, these remedies do not satisfy the statutory preference for treatment as a principal element of the remedy. The EPA's preference for sites that pose relatively low long-term threats or where treatment is impractical is engineering controls, such as containment. In the case of mercury contamination at the Chemical Waste Pond, the preference for treatment will be fulfilled if the post-ROD sampling indicates that excavation, treatment, and disposal are necessary.

For those sites where contaminants are to be left in place (containment and Limited Action) in excess of health-based levels, a review will be conducted every 5 years after ROD signature (statutory 5-year review) to ensure that the remedy is still effective in protecting human health and the environment and to assess the need for future long-term environmental monitoring and administrative/institutional controls. These comprehensive statutory 5-year reviews will be conducted to evaluate factors such as contaminant migration from sites where contamination has been left in place, effectiveness of institutional controls, and overall effectiveness of the remedial actions. For the Limited Action remedy, it is assumed that the institutional controls will remain in place for at least 100 years. The identification of Limited Action with an excavation and disposal option contingency as the selected alternative for TRA-19 and Brass Cap Area is based on the 100-year industrial land use assumption for the TRA. However, the maximum duration of time for which this assumption may be considered valid for purposes of this ROD is up to 100 years from the signing of this ROD.

The agencies agree that no action be taken at 47 additional sites. For those sites for which no action is being taken based on land use assumptions, those assumptions will be reviewed as part of the 5-year review.

Signature Sheet

Signature sheet for the Record of Decision for OU 2-13, located in Waste Area Group 2, Test Reactor Area, of the Idaho National Engineering and Environmental Laboratory, between the U.S. Department of Energy and the Environmental Protection Agency, with concurrence by the Idaho Department of Health and Welfare.

Chuck Clarke

Chuck Clarke, Regional Administrator
Region 10
U.S. Environmental Protection Agency

12-17-97

Date

Signature Sheet

Signature sheet for the Record of Decision for OU 2-13, located in Waste Area Group 2, Test Reactor Area, of the Idaho National Engineering and Environmental Laboratory, between the U.S. Department of Energy and the Environmental Protection Agency, with concurrence by the Idaho Department of Health and Welfare.

Wallace N. Cory ______________________ 12/22/97 ______________

Wallace N. Cory, Administrator
Division of Environmental Quality
Idaho Department of Health and Welfare

Date

Signature Sheet

Signature sheet for the Record of Decision for OU 2-13, located in Waste Area Group 2, Test Reactor Area, of the Idaho National Engineering and Environmental Laboratory, between the U.S. Department of Energy and the Environmental Protection Agency, with concurrence by the Idaho Department of Health and Welfare.

John Wilcynski, Manager
U.S. Department of Energy Idaho Operations Office

12/3/97
Date

CONTENTS

FIGURES

TABLES

ACRONYMS

ARAR	applicable or relevant and appropriate requirement
ATR	Advanced Test Reactor
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
COCA	Consent Order and Compliance Agreement
COPC	contaminant of potential concern
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
EMS	Environmental Management System
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
ETR	Engineering Test Reactor
FFA/CO	Federal Facility Agreement and Consent Order
FRG	final remediation goal
FS	feasibility study
HQ	hazard quotient
IDHW	Idaho Department of Health and Welfare
INEEL	Idaho National Engineering and Environmental Laboratory
IRIS	(EPA) Integrated Risk Information System
LMITCO	Lockheed Martin Idaho Technologies Company
MCL	maximum contaminant level
MTR	Materials Test Reactor

NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NESHAP	National Emission Standards for Hazardous Air Pollutants
NPL	National Priorities List
OU	operable unit
PCB	polychlorinated biphenyl
PRG	preliminary remediation goals
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	Record of Decision
SRPA	Snake River Plain Aquifer
SVOC	semivolatile organic compound
TBC	to be considered
TCLP	toxicity characteristic leaching procedure
TRA	Test Reactor Area
TSCA	Toxic Substances Control Act
UCL	upper confidence level
USGS	United States Geological Survey
VOC	volatile organic compound
WAG	Waste Area Group

Waste Area Group 2 Record of Decision

1. DECISION SUMMARY

1.1 Site Name, Location, and Description

The Idaho National Engineering and Environmental Laboratory (INEEL) is a government facility managed by the U.S. Department of Energy (DOE), located 32 mi (51.5 km) west of Idaho Falls, Idaho, and occupies 890 mi^2 (2,305 km^2) of the northeastern portion of the Eastern Snake River Plain. The Test Reactor Area (TRA) is located in the west-central portion of the INEEL, as shown in Figure 1-1. To better manage environmental investigations, the INEEL is divided into ten Waste Area Groups (WAGs). Identified contaminant release sites in each WAG were in turn divided into operable units (OUs) to expedite the investigations and any required remedial actions. Waste Area Group 2 covers the TRA and contains 13 OUs that were investigated for contaminant releases to environmental pathways. Within these 13 OUs, 55 known or suspected contaminant release sites have been identified. This Record of Decision (ROD) applies to these 55 sites, which, on the basis of the comprehensive remedial investigation(RI)/feasibility study (FS) for WAG 2, were identified as posing a potential risk to human health and/or the environment. Of those 55 sites, 47 are being recommended for "No Action." The locations of the eight sites where remedial action is proposed are shown in Figure 1-2.

Facilities at the INEEL are primarily dedicated to nuclear research, development, and waste management. Surrounding areas are managed by the Bureau of Land Management for multipurpose use. The developed area within the INEEL is surrounded by a 500-mi^2 (1,295-km^2) buffer zone used for cattle and sheep grazing. Communities nearest to the TRA are Atomic City (south), Arco (west), Butte City (west), Howe (northwest), Mud Lake (northeast), and Terreton (northeast). In the counties surrounding the INEEL, approximately 45% is agricultural land, 45% is open land, and 10% is urban. Sheep, cattle, hogs, poultry, and dairy cattle are produced; and potatoes, sugar beets, wheat, barley, oats, forage, and seed crops are cultivated. Most of the land surrounding the INEEL is owned by private individuals or the U.S. Government, as shown in Figure 1-3.

Public access to the INEEL is strictly controlled by fences and security personnel. State Highways 22, 28, and 33 cross the northeastern portion of the INEEL approximately 20 mi (32.2 km) away, and U.S. Highways 20 and 26 cross the southern portion approximately 5 mi (8 km) away. A total of 90 mi (145 km) of paved highways pass through the INEEL and are used by the general public.

The TRA was established in the early 1950s for studying the effects of radiation on materials, fuels, and equipment. Three major reactors have been built at the TRA, including the Materials Test Reactor (MTR), the Engineering Test Reactor (ETR), and the Advanced Test Reactor (ATR). The ATR is currently the only major operating reactor at the TRA. Approximately 420 people are employed at the TRA.

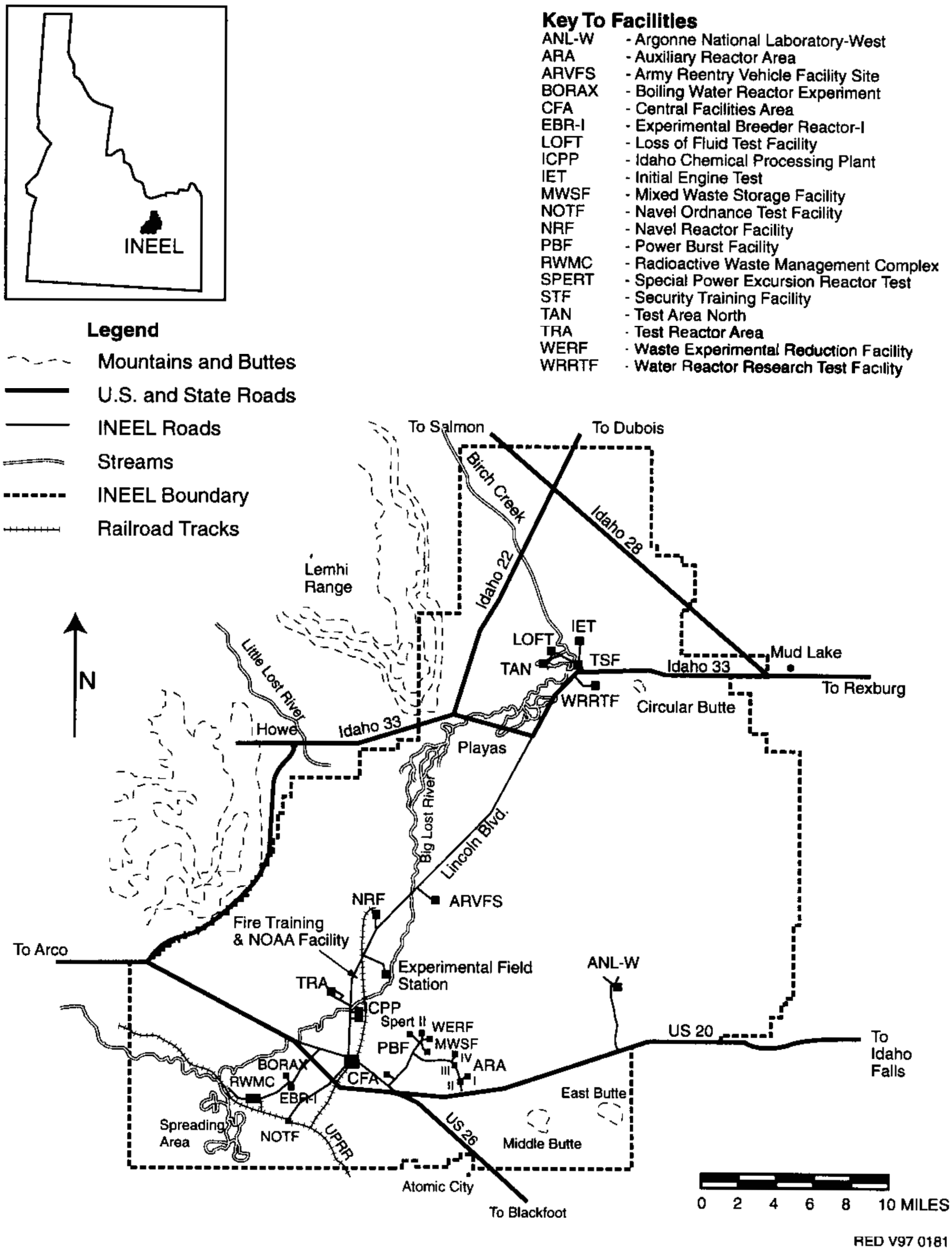
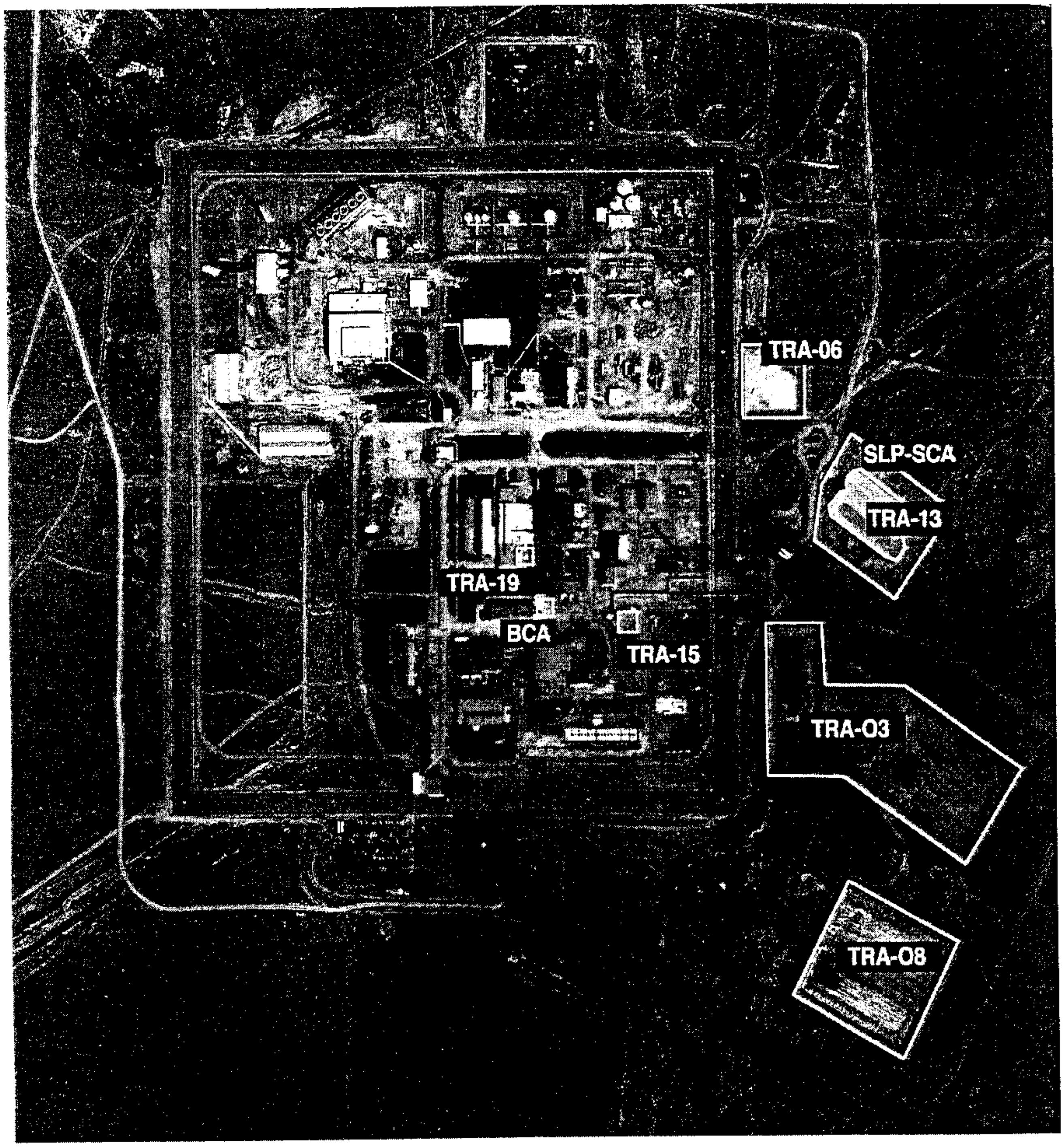


Figure 1-1. Location of the Test Reactor Area.



Release Sites of Concern

Operable Unit No.	FFA/CO Reference No.	Site Description
2-05	TRA-15	Soil Surrounding Hot Waste Tanks at TRA-613
2-05	TRA-19	Soil Surrounding Tanks 1-2 at TRA-630
2-09	TRA-08	Cold Waste Pond (TRA-702)
2-09	TRA-13	Sewage Leach Ponds (2) by TRA-732
2-09	None	Sewage Leach Pond Berm and Soil Contamination Area (SLP-SCA)
2-10	TRA-03	Warm Waste Pond Sediments (Cells 1952, 1957, and 1964)
2-13	TRA-06	Chemical Waste Pond (TRA-701)
2-13	None	Brass Cap Area (BCA)

Figure 1-2. Location of Test Reactor Area sites of concern.

RED V97 0151

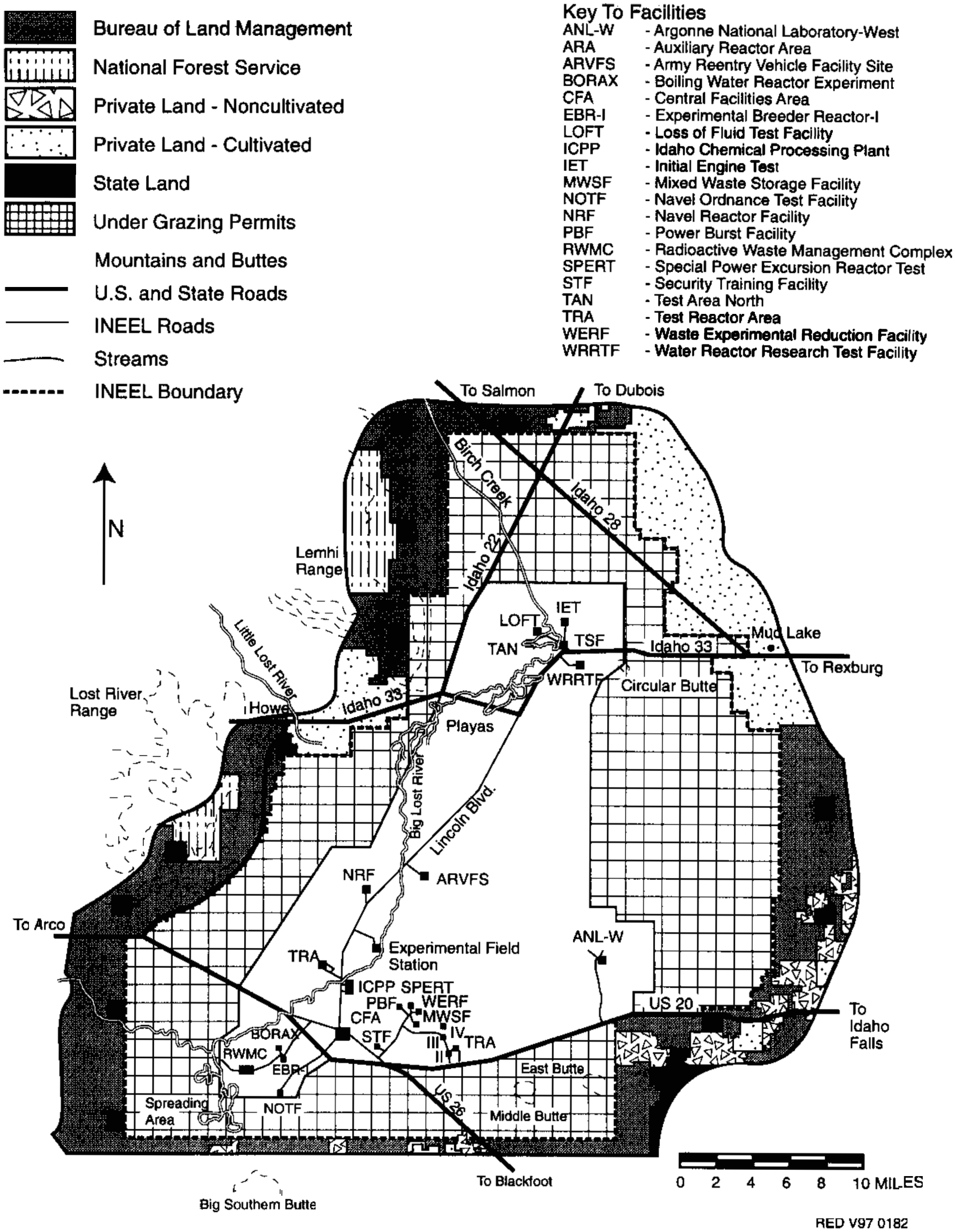


Figure 1-3. Land ownership distribution in the vicinity of the INEEL and onsite areas open for permit grazing.

The Snake River Plain Aquifer (SRPA), the largest potable aquifer in Idaho, underlies the Eastern Snake River Plain and the INEEL. The aquifer is approximately 200 mi (322 km) long, 20 to 60 mi (32.2 to 96.5 km) wide, and covers an area of approximately 9,600 mi^2 (24,853 km^2). The depth to the SRPA varies from approximately 200 ft (61 m) in the northeastern corner of the INEEL to approximately 900 ft (274 m) in the southeastern corner, a distance of 42 mi (67.6 km). Depth to groundwater is approximately 480 ft (146.3 m) below TRA. Drinking water for employees at TRA is obtained from production wells in the northeastern part of the facility.

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

The TRA was established in the 1950s as a testing area for studying the effects of radiation on materials, fuels, and equipment. In July 1989, the Environmental Protection Agency (EPA) proposed listing the INEEL on the National Priorities List (NPL) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The EPA issued a final ruling that listed INEEL as an NPL site in November 1989. The Federal Facility Agreement and Consent Order (FFA/CO) was developed to establish the procedural framework and schedule for developing, prioritizing, implementing, and monitoring response actions at the INEEL in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and the Idaho Hazardous Waste Management Act. The FFA/CO identified 13 OUs within TRA WAG 2 that required further study under the CERCLA process. An additional 10 sites were determined to need no further action at the time the FFA/CO was signed.

The DOE, EPA, and Idaho Department of Health and Welfare (IDHW) decided that hazardous waste release sites at TRA would be remediated through the CERCLA process, as defined in the FFA/CO, which superseded the existing RCRA-driven Consent Order and Compliance Agreement requirements. An investigation was conducted in 1990 at the TRA Warm Waste Pond to support a remedial decision required under CERCLA. An Interim Action ROD was signed in 1991, and an interim action was conducted at the Warm Waste Pond in 1993. The interim action consisted of (1) consolidating sediments contaminated above the action level of 690 pCi/g cesium (Cs)-137 for the Warm Waste Pond 1964 cell and backfilling the 1964 cell with clean material; (2) placing the contaminated Warm Waste Pond 1964 cell sediments into the Warm Waste Pond 1952 cell; (3) collapsing the contaminated sidewalls into the base of the Warm Waste Pond 1957 cell; and (4) covering the contaminated Warm Waste Pond 1957 cell sediments with clean material.

In December 1992, the ROD was issued for OU 2-12, the TRA Perched Water System. The selected remedy was "No Action" with continued groundwater monitoring and a 3-year review of the monitoring system. After 3 years of post-ROD monitoring, chromium and tritium concentrations in two of the SRPA monitoring wells remain above drinking water standards. Overall, good agreement between actual and expected concentrations for other contaminants exists on the basis of the 3 years of study since the OU 2-12 ROD was signed. The deep perched water system wells show that removing the Warm Waste Pond from service has reduced concentrations with time. In general, all monitoring wells show a decreasing contaminant concentration trend, with the exception of one well with chromium and one well with tritium, which show a statistical increase with time. The objectives of the monitoring program are to verify contaminant concentration trends in the SRPA, as predicted by computer modeling, and to evaluate the effect that discontinuing discharge to the Warm Waste Pond has had on contaminant concentrations in the SRPA and the deep perched water system. Since July 1993, groundwater monitoring has been conducted at a network of SRPA wells in the vicinity of the TRA and for selected deep perched water zone wells. This monitoring, currently conducted semiannually, is anticipated to continue until January 1998, at which time the scope of continued future monitoring under the OU 2-13 ROD is anticipated to have been established and implemented.

Localized areas of radionuclide-contaminated soil were located in the North Storage Area and north of the North Storage Area fence at TRA. This soil contamination was removed in the summer of 1995 and 1996 as part of an INEEL-wide cleanup of radioactively contaminated surface soil. Confirmation samples show that removal of this contamination was effective.

The OU 2-13 comprehensive RI/FS conducted at the TRA resulted in the identification of eight sites with potential risk to human health and requiring some type of remedial action (DOE/ID-10531, February 1997). The Proposed Plan (March 1997) identified the agencies' preferred alternative for each site of concern.

3. HIGHLIGHTS OF COMMUNITY PARTICIPATION

In accordance with CERCLA §113(k)(2)(B)(i-v) and §117, a series of opportunities for public information and participation in the RI and decision process for the WAG 2, TRA, was provided to the public from September 1995 through May 1997. The opportunities to obtain information and provide input included "kick-off" and "update" fact sheets, which briefly discussed the status of the comprehensive investigation, numerous *INEEL Reporter* newsletter articles (a publication of the INEEL's Environmental Restoration Program), two Citizens' Guide supplemental updates, a proposed plan, and focus group interactions, which included teleconference calls, briefings and presentations to interest groups, and public meetings. In addition, many public involvement activities were conducted during two previous investigations and RODs at the TRA. The RODs for the Warm Waste Pond Interim Action (1991) and the Perched Water Remedial Investigation (1992) contain summaries of the public involvement activities that were associated with these two former investigations at TRA.

In September 1994, a kick-off fact sheet concerning the WAG 2, TRA comprehensive RI/FS was sent to about 6,700 individuals of the general public and to 60 INEEL employees on the Community Relations Plan mailing list. Included in the fact sheet was a postage-paid return mailer comment form. A total of five comments were received from the public. These comments were evaluated and considered in the preparation stage of the project workplan. In fall of 1994, three public open houses, held in Idaho Falls, Boise, and Moscow allowed citizens an opportunity to interact with DOE Idaho Operations Office (DOE-ID) and Lockheed Martin Idaho Technologies Company employees concerning the nature and extent of the investigation. It was the initial opportunity for the public to be involved in how the investigation would be conducted.

The project was discussed at an informal availability session in Twin Falls (October 11, 1994) and in Pocatello (October 13, 1994). The same opportunity for informal interactions with agency and INEEL representatives was provided for Moscow (October 18, 1994), Boise (October 19, 1994), and Idaho Falls (October 20, 1994). During these briefings, representatives from the DOE and the INEEL discussed the project, answered questions, and listened to public comments and concerns.

Regular reports concerning the status of the project were included in bimonthly issues of the *INEEL Reporter* and were mailed to those on the mailing list. Reports also appeared in two issues of a *Citizens' Guide* to environmental restoration at the INEEL (a supplement to the *INEEL Reporter*) in early 1996 and 1997.

In March 1997, another update fact sheet concerning the project was sent to about 6,700 people on the INEEL Community Relations Plan mailing list. On March 10, 1997, DOE-ID issued a news release to more than 100 media contacts concerning the beginning of a 30-day public comment period pertaining to the WAG 2 TRA proposed plan. This period began March 10, 1997. In response to a request from the public, the comment period was extended 30 days and ended May 9, 1997. Many of the news releases resulted in a short note in community calendar sections of newspapers and in public service announcements on radio stations. Both the fact sheet and news release gave notice to the public that WAG 2 TRA investigation documents would be available before the beginning of the comment period. These documents were available in the Administrative Record section of the INEEL Information Repositories located in the INEEL Technical Library in Idaho Falls, in the INEEL Boise Office, and in public libraries in Fort Hall, Pocatello, and Moscow.

Opportunities for public involvement in the decision-making process concerning the WAG 2 TRA proposed plan began in September 1996 with the establishment of a citizens "focus group" to review the INEEL's Community Relations Plan. The focus group of eight citizens was convened to critique the adequacy of the Community Relations Plan in meeting the public's need for information on the "comprehensive" investigations for an entire WAG. As a result of group interaction with DOE-ID, the State of Idaho, and EPA Region X project managers, it was decided that, for the first time, draft documents being prepared for the upcoming public involvement activities could be reviewed by focus group members. Two teleconference calls to review and discuss the layout and user-friendliness of the information contained in the WAG 2 documents were held in early January for the draft fact sheet and in early February for the draft proposed plan. As a result of focus group recommendations, many of the suggestions identified by the focus group were incorporated into the documents prior to their release to the general public.

For the general public, the activities associated with participating in the decision-making process included receiving the proposed plan, receiving telephone calls, attending the availability sessions one-half hour before the public meetings to informally discuss the issues, and submitting verbal and written comments to the agencies during the 60-day public comment period. At the request of the Shoshone-Bannock Tribes, the three agencies met at Fort Hall in January and March 1997 to give Tribal members and their technical staff a briefing on this proposed plan, as well as on other RIs underway at the INEEL. It was during the second briefing that the Tribes submitted a request for the 30-day extension of the comment period.

Copies of the proposed plan were mailed to 6,700 members of the public on the INEEL Community Relations Plan mailing list on March 7, 1997, urging citizens to comment on the proposed plan and to attend public meetings. Display advertisements announcing the same information concerning the availability of the proposed plan and the locations of public meetings, and the comment period extension, appeared in six regional newspapers during the weeks of March 9, 16, and 23 in Idaho Falls, Boise, Moscow, Fort Hall, Pocatello, and Twin Falls. Large display advertisements appeared in the following newspapers: the Post Register (Idaho Falls); the Sho-Ban News (Fort Hall); the Idaho State Journal (Pocatello); the Times News (Twin Falls); the Idaho Statesman (Boise); and the Daily News (Moscow).

The update fact sheet was mailed on March 21, 1997, to about 6,700 members of the public on the INEEL Community Relations Plan mailing list to encourage them to attend the public meetings and to provide verbal or written comments. Notice was provided in the fact sheet and on its back cover, explaining that the comment period had been extended to May 9, 1997. A series of three news releases and newspaper advertisements, including the notice of the extension of the comment period, provided public notice of these public involvement activities. Offerings for briefings and the 30-day public comment period (including the 30-day extension of the comment period) that was to begin March 10 and end May 9, 1997, were also announced. Personal calls were made to stakeholders in the Idaho Falls, Pocatello, Ketchum, Boise, and Moscow areas the weeks of March 10, 17, and 24 to remind individuals about the meetings and to see if a briefing was desired.

Written comment forms available at the meeting locations (including a postage-paid business-reply form) were available to those attending the public meetings. The forms were used to submit written comments either at the meeting or by mail. The reverse side of the meeting agenda contained a form for the public to use in evaluating the effectiveness of the meetings. A court reporter was present at each meeting to keep transcripts of discussions and public comments. The meeting transcripts were placed in the Administrative Record section for the WAG 2, TRA, OU 2-13 in five INEEL Information Repositories. For those who could not attend the public meetings, but wanted to make formal written comments, a postage-paid written comment form was attached to the proposed plan.

A Responsiveness Summary has been prepared as part of the ROD. All formal verbal comments presented at the public meetings and all written comments are included in Appendix A and in the Administrative Record for the ROD. Those comments are annotated to indicate which response in the Responsiveness Summary addresses each comment.

A total of about 20 people not associated with the project attended the public meetings. Overall, twenty citizens provided formal comments; of these, six citizens provided verbal comments, and fourteen provided written comments. All comments received on the proposed plan were considered during the development of this ROD. The decision for this action is based on the information in the Administrative Record for these OUs.

On March 19, 1997, project managers from DOE-ID gave a brief presentation on the projects to the INEEL Environmental Management Site-Specific Advisory Board. The advisory board is a group of 15 individuals, representing the citizens of Idaho, who make recommendations to DOE, EPA, and the State of Idaho regarding environmental restoration activities at the INEEL.

4. SCOPE AND ROLE OF OPERABLE UNITS AND RESPONSE ACTIONS

The primary source of contamination at WAG 2 is past discharges and releases associated with the TRA warm waste system. For example, radiologically contaminated wastewater was discharged to the Warm Waste Pond. Discharges to the Warm Waste Pond caused contamination of the sediments in the cells of the unit. The Warm Waste Pond was taken out of service and an interim remedial action has been completed (OU 2-10). Infiltration of water from the cells caused the migration of contaminants to the TRA Deep Perched Water System, and ultimately to the SRPA beneath TRA. A ROD has been signed for the Perched Water System (OU 2-12), and post-ROD monitoring is in progress. Windblown contamination, spread principally from the Warm Waste Pond, is the suspected source of contaminations at the Sewage Leach Pond Berm and Soil Contamination Area. In addition, minor areas of contamination are associated with waste lines and storage tanks in the warm waste system. The tanks in OU 2-05 are, or were, part of the warm waste system, and they have associated releases of contamination (TRA-15 and TRA-19). Radiological contamination at the Brass Cap Area is attributed to leaks from the warm waste lines. Waste Area Group 2 also includes sites that have been contaminated as a result of other operational processes such as the Chemical Waste Pond, Sewage Leach Pond, and Cold Waste Pond. Contaminated sediments remain in these unlined disposal ponds.

The TRA is designated as WAG 2 at the INEEL. Each of these OUs contains a number of contaminant release sites. A total of 13 OUs were investigated under a comprehensive RI/FS to evaluate contamination of environmental pathways (soil, air, and groundwater) and the potential risks to human health and the environment from exposure to contaminated media. Each site has been evaluated comprehensively in relation to the other sites to determine the overall risk posed to human health and the environment. A total of 55 known or suspected contaminant release sites were identified. In order to satisfy the broader objective of INEEL comprehensive risk assessments, an analysis of risk produced through the air and groundwater exposure pathways is evaluated in a cumulative manner. A cumulative analysis of these two exposure pathways involves calculating one WAG-wide risk number for each contaminant of potential concern (COPC) in each air and groundwater exposure route. Analyzing the air and groundwater pathways in a cumulative manner is necessary because contaminations from all release sites within a WAG are typically isolated from one another with respect to the soil pathway exposure routes. Therefore, the soil pathway exposure route is analyzed on a release site specific or "noncumulative" basis in the INEEL comprehensive risk assessments. Monitoring data, process knowledge, written correspondence, interviews with current and previous employees, previous agency investigations and decisions, and site characterization data were used to determine the nature and extent of contamination at each site and to evaluate potential risks to human health and the environment. Eight of the 55 sites were found to pose risks to human health that exceed acceptable risk levels and were therefore evaluated for remedial action. The screening, development, and detailed analysis of remedial alternatives resulted in the selection of preferred alternatives for each of the eight sites. These alternatives met the goals established for reducing or eliminating risks to human health and the environment and for complying with applicable or relevant and appropriate requirements (ARARs).

In addition to the eight sites that require some type of remedial action, this comprehensive ROD also addresses 47 sites that do not pose an unacceptable risk to human health or the environment, based on evidence compiled during the comprehensive RI/FS. These sites are being recommended for No Action and, with approval of this ROD, the No Action decision is formalized. Table 4-1 contains a complete listing of the sites at WAG 2; Section 5.2.5 provides a description of the proposed No Action sites.

Table 4-1. List of WAG 2 sites.

Operable Unit	Site Number	Site Name
None	TRA-10	TRA MTR Construction Excavation Pile
	TRA-23	TRA ETR Excavation Site Rubble Pile
	TRA-24	TRA Guardhouse Construction Rubble Pile
	TRA-25	TRA Sewer Plant Settling Pond Rubble Pile
	TRA-26	TRA Rubble Site by U.S. Geological Survey Observation Well
	TRA-27	TRA North Storage Area Rubble Pile
	TRA-28	TRA North (Landfill) Rubble Site
	TRA-29	TRA ATR Construction Rubble
	TRA-32	TRA West Road Rubble Pile
	TRA-33	TRA West Staging Area/Drainage Ditch Rubble Site
OU 2-01	TRA-02	TRA Paint Shop Ditch (TRA-606)
OU 2-02	TRA-14	TRA Inactive Gasoline Tank at TRA-605
	TRA-17	TRA Inactive Gasoline Tank at TRA-616
	TRA-18	TRA Inactive Gasoline Tank at TRA-619
	TRA-21	TRA Inactive Tank, North Side of MTR-643
	TRA-22	TRA Inactive Diesel Fuel Tank at ETR-648
OU 2-03	None	TRA-614 Oil Storage North
	TRA-01	TRA Acid Spill Disposal Pit
	TRA-11	TRA French Drain at TRA-645
	TRA-12	TRA Fuel Oil Tank Spill (TRA-727B)
	TRA-20	TRA Brine Tank (TRA-731) at TRA-631
	TRA-40	TRA Tunnel French Drain (TRA-731)
OU 2-04	None	TRA PCB Spill at TRA-619
	None	TRA PCB Spill at TRA-626
	None	TRA-627 No. 5 Oil Spill
	None	TRA PCB Spill at TRA-653
	None	TRA-670 Petroleum Product Spill
	None	TRA PW 13 Diesel Fuel Contamination
	TRA-09	TRA Spills at TRA Loading Dock (TRA-722)
	TRA-34	TRA North Storage Area

Table 4-1. (continued).

Operable Unit	Site Number	Site Name
OU 2-05	None	TRA-603/605 Tank
	TRA-15	TRA Hot Waste Tanks Nos. 2, 3, and 4 at TRA-613
	TRA-16	TRA Inactive Radioactive Contaminated Tank at TRA-614
	TRA-19	TRA Radioactive Tanks 1 and 4 at TRA-630, replaced by Tanks 1, 2, 3, and 4
OU 2-06	TRA-30	TRA Beta Building Rubble Site
	TRA-31	TRA West Rubble Site
	TRA-35	TRA Rubble Site East of West Road near Beta Building Rubble Pile
OU 2-07	None	TRA-653 Chromium-Contaminated Soil
	TRA-36	TRA ETR Cooling Tower Basin (TRA-751)
	TRA-38	TRA ATR Cooling Tower (TRA-771)
	TRA-39	TRA MTR Cooling Tower North of TRA-607
OU 2-08	TRA-37	TRA MTR Canal in basement of TRA-603
OU 2-09	TRA-07	TRA Sewage Treatment Plant (TRA-624) and Sludge Pit (TRA-07)
	TRA-08	TRA Cold Waste Disposal Pond (TRA-702)
	TRA-13	TRA Final Sewage Leach Ponds (2) by TRA-732, including SLP-Berm and Soil Contamination Area
OU 2-10	TRA-03B	TRA Warm Waste Pond (sediments)
OU 2-11	TRA-03A	TRA Warm Waste Leach Pond (TRA-758)
	TRA-04	TRA Warm Waste Retention Basin (TRA-712)
	TRA-05	TRA Waste Disposal Well, Sampling Pit (764) and Sump (703)
OU 2-12	None	Perched Water RI/FS
OU 2-13		WAG 2 Comprehensive RI/FS including:
	TRA-06	TRA Chemical Waste Pond (TRA-701)
	TRA-41	French Drain Site
	TRA-42	Diesel Unloading Pit
	None	Brass Cap Area
	None	Hot Tree Site
	None	ETR Stack Area

5. SUMMARY OF SITE CHARACTERISTICS

5.1 Physiography, Geology, and Hydrology

The INEEL is located on the northeastern portion of the Eastern Snake River Plain, a volcanic plateau that is composed primarily of silicic and basaltic volcanic rocks and relatively minor amounts of sediment. Underlying the INEEL is a series of basaltic flows with sedimentary rock interbeds. The basalts beneath the TRA are relatively flat and are covered by 30 to 75 ft (9 to 23 m) of alluvial materials and loess. The alluvial materials are composed primarily of well to poorly graded gravel and contain minor amounts of fine-grained materials.

The depth to the SRPA varies from 200 ft (61 m) in the northern portion to 900 ft (274 m) in the southern portion of the INEEL. At TRA, the depth to the SRPA is approximately 450 ft (137 m). Regional groundwater flow is to the southwest. Above the main aquifer, there are both shallow and deep zones of perched water created by lenses of low permeability sediments (containing silts and clays) within an interbedded basalt-sediment sequence overlying the primary basalt flows. These perched zones are discontinuous and are found at varying depths throughout the TRA.

The climate of the INEEL region is characterized as semidesert with hot summers and cold winters. Normal annual precipitation is 8.71 in. (22.1 cm). The only natural sources of surface water present at the INEEL are Birch Creek, the Little Lost River, and the Big Lost River, which is approximately 1 mi (1.6 km) southeast of the TRA. However, the Big Lost River is typically dry because of the arid climate and high infiltration rates of the alluvium. The only other natural source of surface water at the TRA is occasional heavy precipitation, which results in surface water runoff in natural drainage areas, usually during the period of January through April of each year.

Fifteen distinctive vegetative cover types have been identified at the INEEL, with sagebrush being the dominant species. There are five vegetation types surrounding the TRA: sagebrush-steppe on lava, sagebrush/rabbitbrush, grassland, playa-bareground/disturbed, and juniper. The variety of habitats on the INEEL supports numerous species of reptiles, birds, and mammals. Several bird species warrant special concern because of their threatened status or sensitivity to disturbance. These species include the ferruginous hawk (Buteo regalis), bald eagle (Haliaeetus leucocephalus), prairie falcon (Falco mexicanus), merlin (Falco columbarius), long-billed curlew (Numenius americanus), and the burrowing owl (Athlene cunicularia). The ringneck snake, whose occurrence is considered to be INEEL-wide, is listed by the Idaho Department of Fish and Game as a Category C sensitive species. It should be noted, however, that the TRA is a highly disturbed industrial area with almost continuous human activity that contains little suitable habitat for most of these species. No areas of critical habitat, as defined in 40 Code of Federal Regulations (CFR) Part 300, are known to exist in or around the TRA.

The TRA is located in the south-central portion of the INEEL. The land surface at TRA is relatively flat, with elevations ranging from 4,945 ft (1,507 m) on top of a rubble pile near the Cold Waste Pond to 4,908 ft (1,496 m) at the bottom of the Chemical Waste Pond. Generally, the land surface gently slopes from the west-southwest corner [4,930 ft (1,503 m)] to the east-northeast corner [4,915 ft (1,498 m)].

Much of the INEEL's surface is covered by Pleistocene and Holocene basalt flows. The second most prominent geologic feature is the flood plain of the Big Lost River. Alluvial sediments of Quaternary age occur in a band that extends across the INEEL from the southwest to the northeast. The alluvial deposits grade into lacustrine deposits in the northern portion of the INEEL, where the Big Lost River enters a series of playa lakes. Paleozoic sedimentary rocks make up a very small area of the INEEL along the northwest boundary. Three large silicic domes and a number of smaller basalt cinder cones occur on the INEEL and along the southern boundary.

A complex sequence of basalt flows and sedimentary interbeds underlie TRA. From basalt flow samples collected, petrographically similar basalt flows were correlated into 23 flow groups that erupted from related source areas. Known source vents occur to the southwest, along what is referred to as the Arco volcanic rift zone, to the southeast along the axial volcanic zone, and to the north at Atomic Energy Commission Butte. Surficial material at TRA consists of alluvial and terrace deposits of the Big Lost River and is composed of unconsolidated fluvial deposits of silt, sand, and pebble-sized gravel. The uneven alluvial thickness and undulating basalt surface at TRA are common of basalt flow morphology. The basalt flows that underlie the surficial alluvium are separated by sedimentary interbeds that vary in thickness and lateral extent.

The TRA is located on the alluvial plain of the Big Lost River. The thickness of surficial sediment in the vicinity of TRA ranges from 30 to 75 ft (9 to 23 m) and is greatest south of the facility. The surficial sediments at TRA are primarily composed of well to poorly graded gravel and contain minor amounts of fine-grained materials. Most of the soil textures are sandy loams and the primary soil type is mapped as Bannock sandy loam. The TRA is not located in a 100-year flood plain. An extensive flood control system has been built at the INEEL that uses a diversion gate and a series of spreading areas to control high flows from the Big Lost River, which typically occur in the late spring or early summer.

An area north of TRA where surface runoff accumulates contains some damp areas with sedges and wetland grasses; however, the area is not mapped by the INEEL wetland inventory. It is not expected that any remedial activities would impact these potentially sensitive areas.

The area surrounding TRA has been surveyed in the past, and no sites of archaeological or historical value were found. All potential remedial areas within the fenced area of TRA are considered disturbed areas that do not contain material of archaeological or historic significance. Therefore, the regulatory requirements associated with the preservation of antiquities and archaeological materials/sites are not a concern.

The TRA is not known to be located within a critical habitat of an endangered or threatened species, including bald and golden eagles, nor are such species known to frequent the TRA proximity. However, bald eagles, golden eagles, and American perigrin falcons have been observed at the INEEL. In addition, eight species of concern to the Idaho Department of Fish and Game and Bureau of Land Management have been observed at the INEEL. Remedial activities at WAG 2 are not expected to affect any endangered species because activities are anticipated to be conducted entirely in previously disturbed areas, and limited in both duration and affected area.

No fish or wildlife addressed by the Threatened Fish and Wildlife Act are found at WAG 2, nor do the planned activities at WAG 2 involve the modification of a stream because no streams are located on the site. Occasionally, migratory waterfowl are observed at WAG 2. However, the area contains no critical habitat, and remedial activity does not appear to have a potential for adverse impacts to migratory waterfowl.

Several sites located within the WAG 2 area have been deemed potentially eligible for the National Register of Historic Places by the Idaho State Historical Society. The sites include the MTR, the ETR, and the ATR. These sites must be accorded the same protection under the National Historic Preservation Act as if they were listed sites under the Act. Remedial activities within WAG 2 are not expected to adversely affect the sites; however, should future planning identify activities that would potentially impact the sites, proper mitigative measures would be identified through discussion with the Idaho State Historical Preservation Office.

The SRPA occurs approximately 450 ft (137 m) below TRA and consists of a series of saturated basalt flows and interlayered pyroclastic and sedimentary materials. The EPA designated the SRPA as a sole-source aquifer under the Safe Drinking Water Act on October 7, 1991. The aquifer is relatively permeable because of the presence of fractures, fissures, and voids such as lava tubes in the basalt. Groundwater flow in the SRPA is to the south-southwest at rates between 5 and 20 ft (1.5 and 6 m) per day.

Two perched water zones have been recognized below TRA. In the vicinity of the ponds and retention basin, a shallow perched water zone is formed at a depth of approximately 50 ft (15.2 m). Finer grained sediments and fracture infilling at the alluvium and basalt interface areas impede the downward movement of water, resulting in perched conditions. The shallow perched water eventually percolates through the underlying basalt to a deeper perched water zone. The deep perched water is also caused by low-permeability sediments within the interbedded basalt-sediment sequence and occurs at a depth of approximately 140 to 200 ft (43 to 61 m). These sediments include silt, clay, cinders, and gravel and appear to be laterally continuous in the vicinity of TRA. The shallow and deep perched waters are two separate zones, with the possible exception of the area of the ponds where they may become one zone depending on the volume of wastewater discharge to the ponds. The perched water bodies are present because approximately 200 million gal (757 million L) per year of water have been sent to the TRA disposal ponds over the past several decades. A major contributor to contamination in the perched water bodies resulted from discharges to the old Warm Waste Pond. Low-level radioactive waste discharges were discontinued on August 12, 1993, when the former Warm Waste Ponds were replaced with a lined evaporation pond. The Cold Waste Pond currently receives an average of approximately 300 gal (1,135 L) per minute of uncontaminated wastewater. There appears to be a strong correlation between hydraulic head patterns in the Perched Water System and the discharge rates to the Cold Waste Pond. In addition, discharges to the Chemical Waste Pond, an unlined surface impoundment designed as an infiltration pond to receive chemical waste from the demineralization plant, average approximately 15 gal (57 L) per minute.

Waste Area Group 2 encompasses approximately 74 acres (30 hectares), with the majority of the acreage associated with extensive facilities consisting of buildings, graveled parking areas, roads, and cleared fence lines. Surrounding the TRA, however, are several pond areas that were used for the conveyance and discharge of wastewater from facility operations as shown in Figure 1-2. These ponds contain a variety of potentially hazardous contaminants with the primary contaminants being radionuclides. After several of the ponds were removed from service, exposed sediments were subjected to winds resulting in the surrounding surficial soils being contaminated with low levels of radionuclides. An interim cleanup action occurred at the former warm waste disposal pond.

In addition to the disposal ponds and associated windblown contamination, several other types of potentially contaminated sites were identified at the TRA. These sites include: rubble piles, a paint shop ditch, petroleum tanks, a disposal pit, french drains, brine tank, petroleum and polychlorinated biphenyl (PCB) spills, radiological tanks, cooling towers, a reactor canal, sewage treatment facility, a retention basin, disposal well, and a sampling pit and sump. Possible contaminants consist of organic compounds including petroleum hydrocarbons and PCBs, acids, bases, heavy metals, and radionuclides.

5.2 Nature and Extent of Contamination

The following sections describe the nature and extent of contamination at the eight sites that have been determined to pose an unacceptable risk to human health or the environment. These eight sites within TRA have actual or threatened releases of hazardous substances, which, if not addressed by implementing the response actions selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

5.2.1 Disposal Pond Sites

5.2.1.1 Warm Waste Pond (TRA-03). The source of contamination in sediments of the three cells [1952, 1957, and 1964, (Figure 5-1)] was low-level radionuclide contaminated wastewater discharged to the three cells from TRA reactor operations. The wastewater included cooling tower effluent, wastewater from hot cell drains, laboratory solutions, and floor drainage from the ATR and other test reactors. The resulting contamination consisted primarily of radionuclide-contaminated sediments in the pond bottoms and sidewalls to depths of approximately 2 ft (0.6 m). The primary contaminants of concern (COCs) are Cs-137, cobalt (Co)-60, and chromium (Cr). Concentrations of Cs-137 range from 2.9 to 39,400 pCi/g and of Co-60 range from 0.2 to 27,100 pCi/g. Concentrations of chromium in the sediments ranged from 0 to 222 mg/kg. Data indicate that both chromium and radionuclides were strongly adsorbed into the surficial sediments and that soil contamination generally did not extend beyond a depth of 2 ft (0.6 m) below the base of each cell.

In 1993, the Warm Waste Pond was replaced by a lined evaporation pond. An interim remedial action was subsequently conducted to provide immediate risk reduction by removing approximately 4 ft (1.2 m) of sediment from the sidewall and 3 ft (0.9 m) of sediment from the base of the 1964 cell and placing of these excavated materials into the 1952 cell. Previously stockpiled materials from cleanup of Warm Waste Pond windblown contamination was also placed in the 1952 cell. The 1964 cell was then backfilled with approximately 10 ft (3 m) of clean soil, and the 1952 cell was covered with a 1.0-ft (0.31-m) layer of clean fill and then revegetated. The balance of the stockpiled material was distributed on the sidewalls of the 1957 cell as shielding. The 1957 cell sidewall sediment was then scraped into the base of the 1957 cell followed by disposal of materials from a demolished contaminated wooden structure. The 1957 cell was then covered with a 0.5-ft (0.15-m) layer of clean fill. The 1957 cell was not capped because appropriate fill material was being identified and evaluated. In 1995 and 1996, material from OU 10-06 removal actions was also placed in the 1957 cell, including soil contaminated with Cs-137 from the Argonne National Laboratory stockpile, soil contaminated with Cs-137 from the Boiling Water Reactor Experiment, soil contaminated with Cs-137 from the Experimental Breeder Reactor, soil contaminated with several radionuclides including strontium (Sr)-90, europium (Eu)-152, americium (Am)-241, Cs-137, Eu-154, and Co-60 from the TRA North Storage Area, soil contaminated with Cs-137 and Sr-90 from Test Area North Area B, and soil contaminated with Cs-137 and Sr-90 from the Technical Support Facility. Again, 0.5 ft (0.15 m) of clean fill was placed over these materials. This soil was analyzed for polychlorinated biphenyls (PCBs); however, none were detected. The maximum detection limit of the data set was 0.220 ppm. The agencies have determined that these soils need not be managed as PCB-

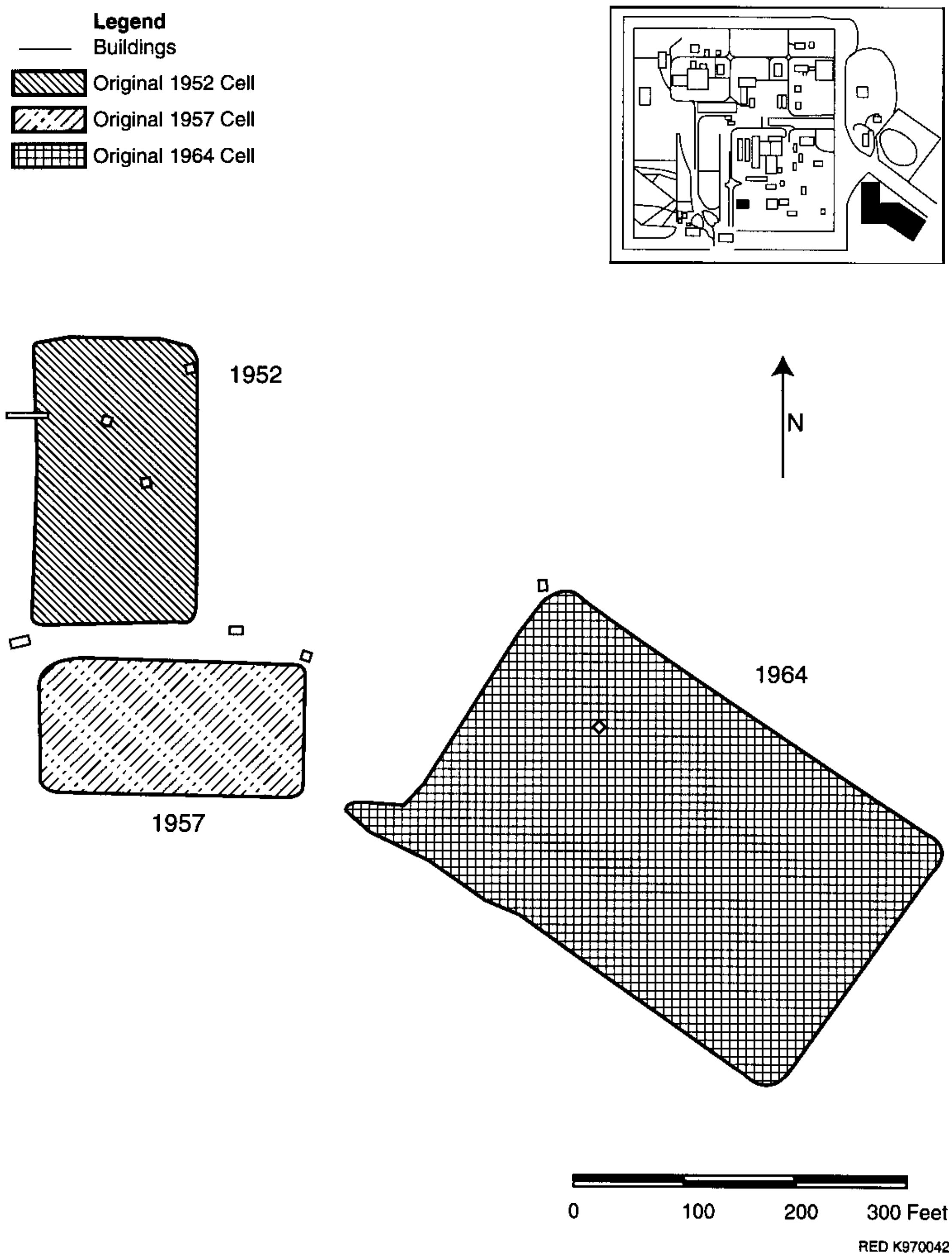


Figure 5-1. Warm Waste Pond (TRA-03) location.

contaminated soil since the residual PCB levels are below the Office of Solid Waste and Emergency Response directive guidance level of 25 ppm at Superfund Sites.

Additionally, recent investigations have determined that RCRA-listed waste may have been present in the TRA Warm Waste System when discharges from the warm waste system to the pond occurred. Soil placed in the warm waste pond from Test Area North may be contaminated with RCRA-listed waste. Information regarding releases of RCRA-listed waste can be found in the "RCRA-listed Waste Determination Report for the INEEL Test Reactor Area, October 30,1997," which has been placed in the Administrative Record. Pages 3-21 through 3-23 of the OU 2-13 comprehensive RI/FS report provide more detailed information on the COC concentrations and volumes of soil consolidated in the OU 2-10 Warm Waste Pond.

5.2.1.2 Chemical Waste Pond (TRA-06). The Chemical Waste Pond was excavated and put into operation in 1962 as an unlined infiltration pond designed to receive chemical waste from a demineralization plant at the TRA. The pond currently receives effluent containing mineral salts, with average discharge to the pond being 15 gal (57 L) per minute. In addition, until 1982, solid and liquid wastes were disposed directly into the pond from a support structure constructed for waste disposal. This disposal included corrosives and other waste. A tank containing battery acid from the vehicle storage facility at the Central Facilities Area was drained into the Chemical Waste Pond in 1992. Possible disposals into the pond, including pesticides, solvents, PCBs, methylene chloride, and biocides, are suspected, but not documented. However, the Track 1 document for this site indicates that these reports are unsubstantiated. Samples collected from the pond in 1990 (Figure 5-2) were analyzed for metals known to be associated with the demineralization process (i.e., silver, arsenic, barium, cadmium, chromium, copper, mercury, nickel, selenium, and zinc), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and PCBs. The sample results indicate that only barium and mercury exceed background levels presented in the OU 10-06 soil background document. The Chemical Waste Pond is identified in the FFA/CO as a land disposal unit. Application materials for a wastewater land application permit were submitted to the State of Idaho for review in late January 1997.

Maximum total concentrations of the metals were 3,830 mg/kg for barium and 133 mg/kg for mercury in an area where standing water occurs within the pond. The two metals have the highest concentrations in surface sediments, with concentrations decreasing with depth to background concentrations from 10 to 16 ft (3 to 5 m) below the surface. In the 1990 sampling event, PCBs were detected in 20 surface samples, with a maximum concentration of 0.33 mg/kg; they were not detected in subsurface samples. Volatile organic compounds and SVOC concentrations were either undetectable or below regulatory concern.

The most recent release of hazardous materials occurred in May and June 1995, when approximately 287,100 gal (1,068,788 L) of liquid used to neutralize and flush out-of-service acid and caustic tanks were disposed to the pond. After disposal it was determined that the liquids contained 0.3 ppm of mercury, which exceeds the toxicity characteristic leaching procedure (TCLP) limit of 0.2 ppm for D009 mercury hazardous waste. The total mass of mercury contained in the Chemical Pond from all past disposal operations is estimated to be approximately 8.0E+07 mg. The mercury contribution from the 1995 release is relatively small and is not expected to increase human health or ecological risk at the site.

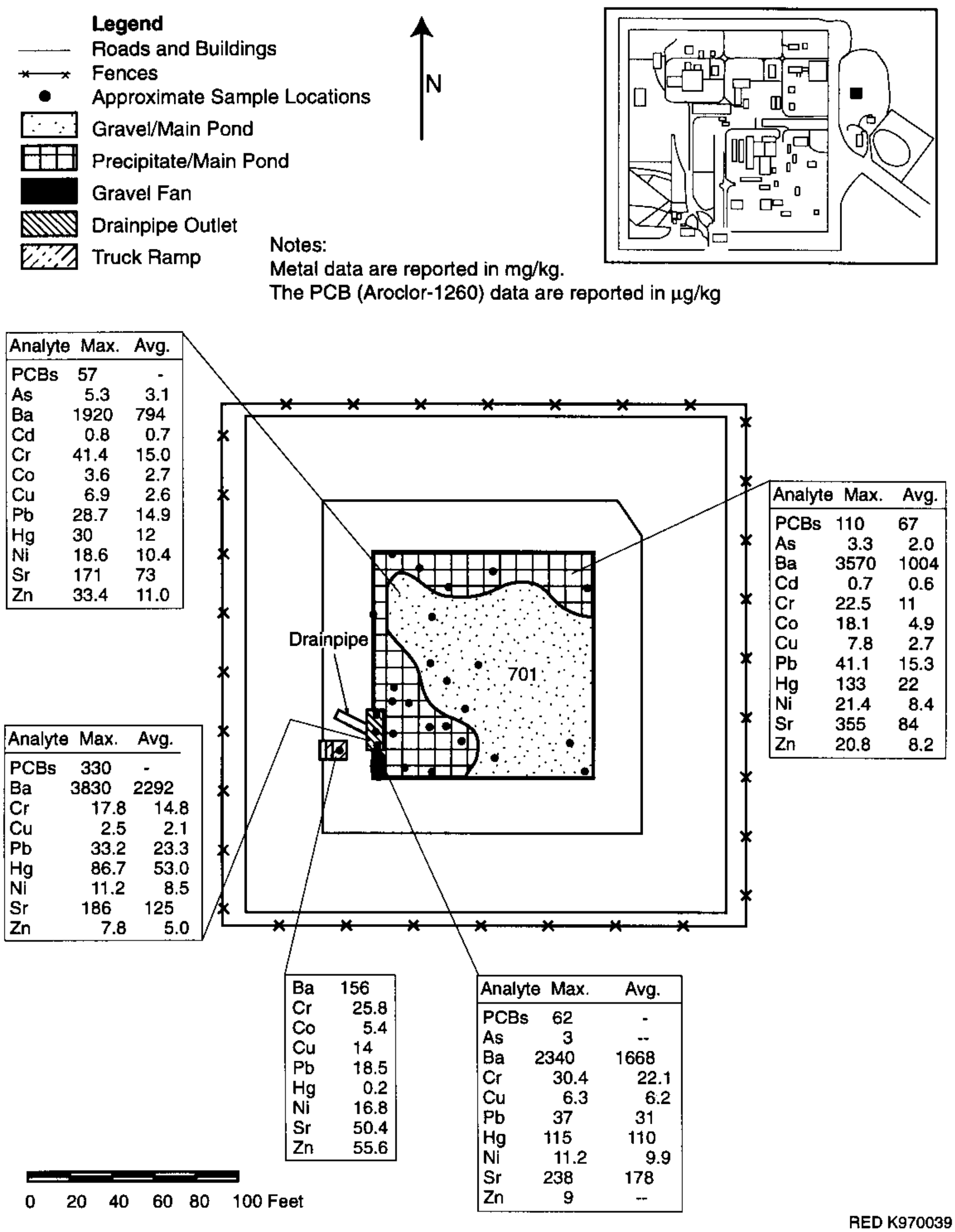


Figure 5-2. Chemical Waste Pond (TRA-06) showing 1990 sample locations with maximum average data for PCBs and metals.

5.2.1.3 Cold Waste Pond (TRA-08). The Cold Waste Pond has been continually managed as a disposal site for nonradiologically contaminated wastewater since its construction in 1982. The pond consists of two cells, which are used for cold waste disposal, primarily from cooling tower effluent and from air conditioning units, secondary system drains, floor drains, and other nonradioactive drains throughout TRA. Historically, only one of the two cells is used at a time, and flow of wastewater is alternated from one cell to another on an annual basis. Wastewater that is discharged into the Cold Waste Pond percolates through the soil to form the perched water zones beneath TRA. Effluent routed to the pond has been monitored for metals, organic compounds, and radionuclides since 1986. Soil samples were collected from the bottom of the two cells in 1990 (Figure 5-3) and analyzed for gamma-emitting radioisotopes, TCLP metals, and VOCs. Radionuclides, including Co-60, Cs-134, Cs-137, and Eu-154, were detected at concentrations slightly above INEEL background levels in several samples. These low levels of radionuclides were found in samples collected from the pond berms and are thought to be the result of windblown soil contamination from the Warm Waste Pond rather than from effluents discharged to the Cold Waste Pond. Low levels of VOCs (carbon tetrachloride, tetrachloroethylene, tetrahydrofuran, 1,1,1-trichloroethane, and xylene) and metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, and silver) were also detected in the pond sediments.

In addition, in May 1996, sediment samples were collected from the Cold Waste Pond. Radionuclides, including Co-60, Cs-137, and Am-241, were detected at background or slightly above background concentrations. The results of this sampling effort can be found in the Administrative Record under the OU 2-13 Comprehensive RI/FS. Currently, a wastewater land application permit was submitted to the State of Idaho for review and approval in late January 1997.

5.2.1.4 Sewage Leach Pond (TRA-13). The Sewage Leach Pond is located outside the TRA facility fence and consists of two cells where effluent was discharged from sanitary sewer drains throughout TRA. The first cell (southern) was constructed in 1950 and the second (northern) in 1965. The system was routinely monitored by the Environmental Monitoring Unit beginning in 1986. Process knowledge indicates that effluent is limited to sewage. However, low-level gamma-emitting radionuclides were detected in the bottom of the 1950 cell, and alpha and gamma-emitting radionuclides were detected in a sludge pit located south of the Sewage Treatment Plant. The source of the contamination has been attributed to windblown sediments from the Warm Waste Pond. After a preliminary investigation, DOE-ID recommended that the bottom of the pond be backfilled when it was removed from service. IDHW and EPA concurred. Construction of a new sewage treatment facility, including a lined evaporation pond, was completed in December 1995, and the former Sewage Leach Pond and Sewage Treatment Plant were removed from service.

5.2.2 Subsurface Release Sites

Recent investigations have determined that RCRA-listed waste may have been present in the TRA warm and hot waste systems when leaks from the systems to the environment occurred. Therefore, soils at those sites associated with releases from the warm waste system or hot waste system will be managed in a manner consistent with the hazardous waste determination to be performed at the time of the remedial action.

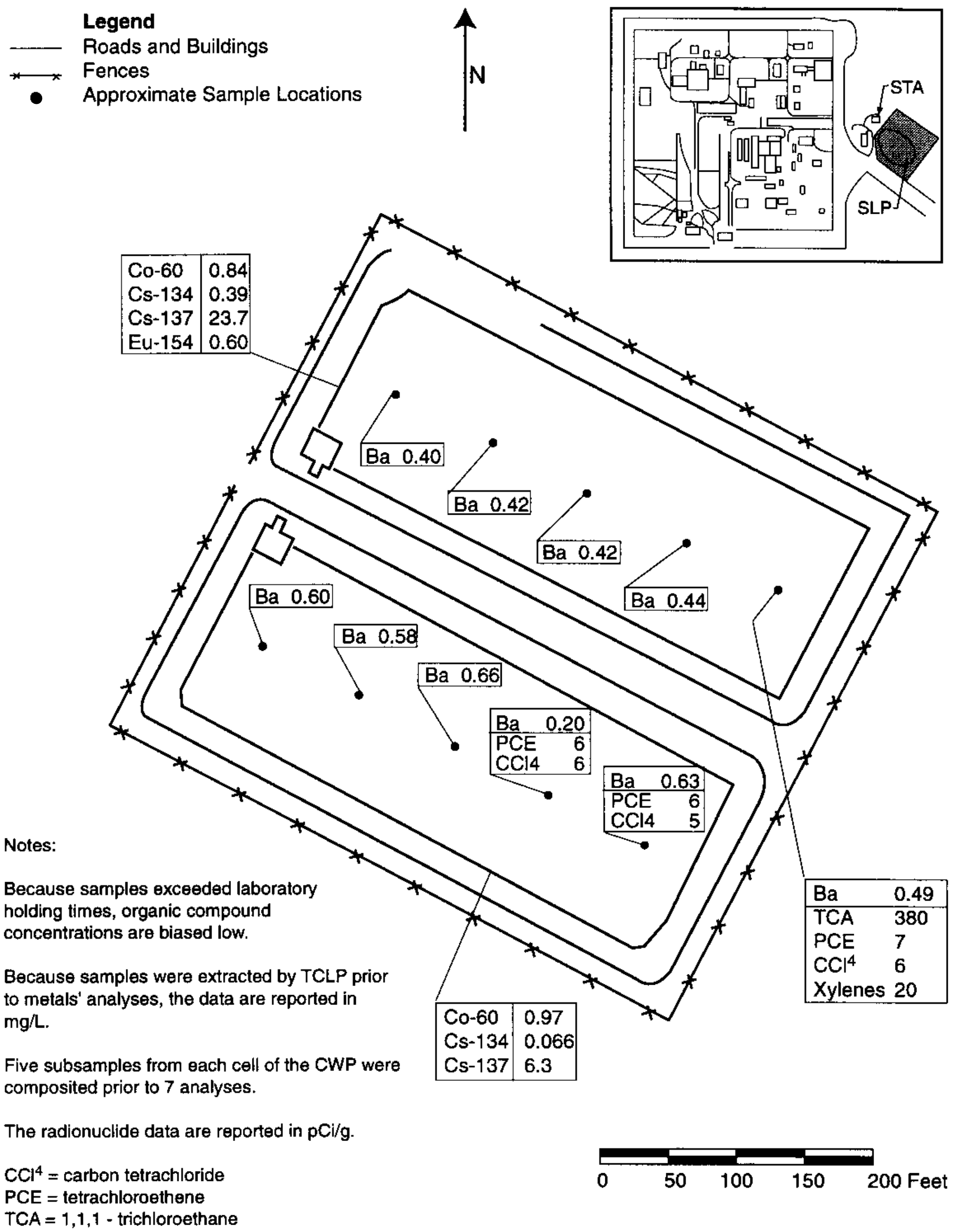


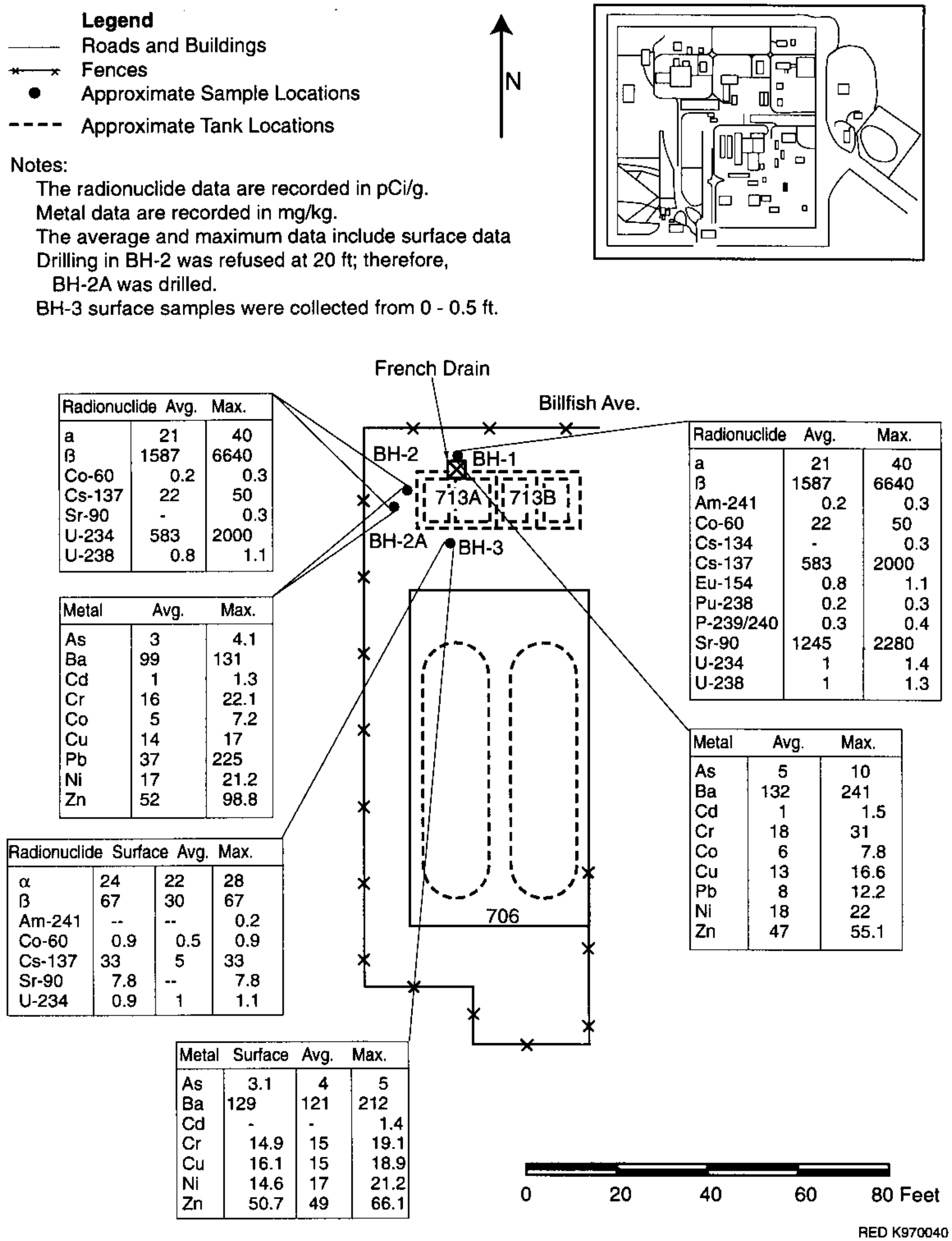
Figure 5-3. Cold Waste Pond (TRA-08) showing 1990 soil sample location, organic compound and metal data, and composite gamma data.

5.2.2.1 Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15). The TRA-15 site is the location of underground Tanks 1 and 2 that leaked radiologically contaminated and possibly hazardous waste to surrounding soil. Four underground tanks are located at this site. Leaks from Tank 1 were determined to be the source of subsurface contamination identified in the 1993–1994 time frame. Four borings were drilled from the surface to basalt to depths of 30 to 31 ft (~9.5 m), as shown in Figure 5-4. Samples collected from these borings show soil is contaminated with Sr-90 and Cs-137 at or below a depth of 20 ft (6 m). Surface spills and leaks were also reported, but a surface soil contamination assessment conducted in 1994 showed that only low levels of Cs-137 to a maximum of 8.3 pCi/g were detected. However, surface samples collected in 1993 from borehole No. 3 showed Cs-137 concentrations as high as 33 pCi/gm.

Lead was detected in all the samples and ranged from 4.9 to 225 mg/kg. Chromium was detected from 4.45 to 31 mg/kg, and arsenic was detected from 2.1 to 10 mg/kg. Sampling results indicate that volatile and semivolatile constituents were not detected at the site.

5.2.2.2 Soil Surrounding Tanks 1 and 2 at Building TRA-630 (TRA-19). The TRA-19 site (Figure 5-5) consists of subsurface soil contamination suspected of resulting from leaks from the radiologically contaminated waste drain line that originates at the Gamma Facility Building (TRA-641) or from possible releases from four underground catch tanks associated with the MTR. The original four catch tanks from the MTR were contained in a concrete vault. The tanks and vault were removed and replaced with new ones in 1985 and 1986. The original tanks were found to be intact upon removal and although the outside surface appeared to be degrading, the fiberglass liners had not been breached. Therefore, no releases from the tanks were suspected. Several spills inside the vault, however, had been reported as a result of pipe-cutting operations during tank removal, from reconnecting pipelines to the new tanks, and from a damaged waste drain line from Building TRA-641, but nothing was released to the soil that remained after the tank upgrade. Recently it has been determined that hazardous waste has been and are being contained in the hot waste catch tanks near the TRA-19 release site. This raises the concern regarding whether releases associated with the hot waste system (i.e., TRA-19, TRA-15, and the Brass Cap Site) were appropriately characterized given the probability of nonradionuclide hazardous constituents having been released and only radionuclide sampling analysis performed. To address this issue, the agencies agreed that TRA-15 could serve as a corollary for release sites associated with the Hot Waste System because more complete characterization was performed at TRA-15 (radionuclides, metals, volatile, and semivolatile organic compounds). However, the data collected would not be sufficient to fully support a hazardous waste determination at TRA-15, TRA-19, and Brass Cap Area given the present knowledge of other listed hazardous wastes that were not sampled/analyzed as part of the general investigation at TRA-15. Therefore, a hazardous waste determination will need to be completed when excavation and disposal occur and the soil managed accordingly.

Limited sampling conducted at TRA-19, information from field screening data collected during tank removal, and information from Health Physics Technician logs indicate that COCs in soil resulting from pipeline leaks are likely to include Co-60, Cs-134, Cs-137, and Sr-90. The contamination is suspected to be the result of a leak from the radiologically contaminated waste drain line that originates at the Gamma Facility Building (TRA-641) rather than the TRA-730 tanks or tank vault. Because the line is located at a depth of 8 ft (2.4 m), the contamination is suspected to extend below this depth. It should be noted that the Gamma Facility Building is no longer in use and is scheduled to undergo decontamination and decommissioning.



Radionuclide	Avg.	Max.
a	21	40
ß	1587	6640
Co-60	0.2	0.3
Cs-137	22	50
Sr-90	-	0.3
U-234	583	2000
U-238	0.8	1.1

Metal	Avg.	Max.
As	3	4.1
Ba	99	131
Cd	1	1.3
Cr	16	22.1
Co	5	7.2
Cu	14	17
Pb	37	225
Ni	17	21.2
Zn	52	98.8

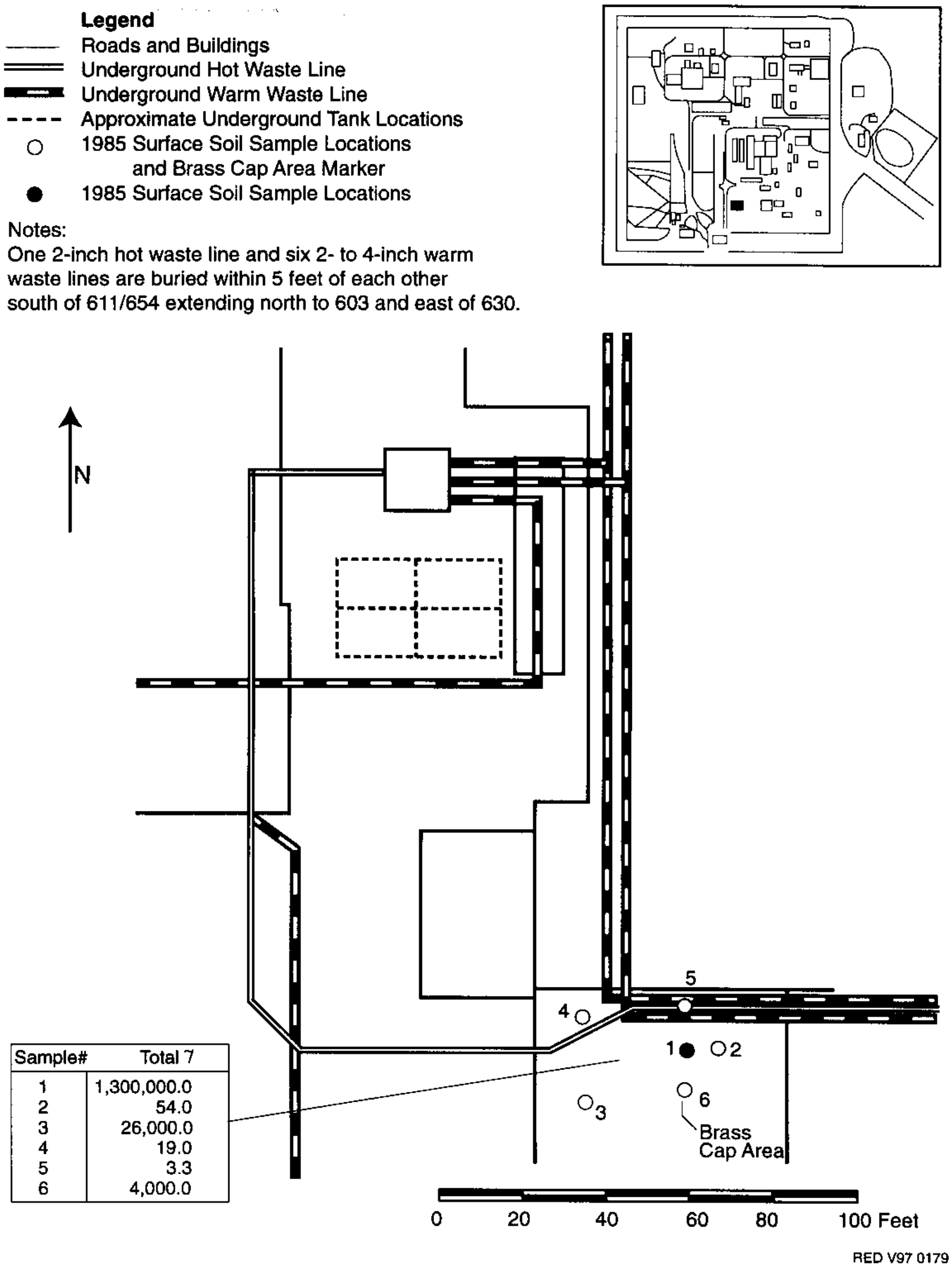
Radionuclide	Surface	Avg.	Max.
α	24	22	28
ß	67	30	67
Am-241	--	--	0.2
Co-60	0.9	0.5	0.9
Cs-137	33	5	33
Sr-90	7.8	--	7.8
U-234	0.9	1	1.1

Metal	Surface	Avg.	Max.
As	3.1	4	5
Ba	129	121	212
Cd	-	-	1.4
Cr	14.9	15	19.1
Cu	16.1	15	18.9
Ni	14.6	17	21.2
Zn	50.7	49	66.1

Radionuclide	Avg.	Max.
a	21	40
ß	1587	6640
Am-241	0.2	0.3
Co-60	22	50
Cs-134	-	0.3
Cs-137	583	2000
Eu-154	0.8	1.1
Pu-238	0.2	0.3
P-239/240	0.3	0.4
Sr-90	1245	2280
U-234	1	1.4
U-238	1	1.3

Metal	Avg.	Max.
As	5	10
Ba	132	241
Cd	1	1.5
Cr	18	31
Co	6	7.8
Cu	13	16.6
Pb	8	12.2
Ni	18	22
Zn	47	55.1

Figure 5-4. Hot Waste Tanks at Building 613 (TRA-15) showing 1993 soil boring locations and soil sample data.



Sample#	Total 7
1	1,300,000.0
2	54.0
3	26,000.0
4	19.0
5	3.3
6	4,000.0

Figure 5-5. Radioactive Tanks at Building 630 (TRA-19) and Brass Cap Area showing 1985 γ data in pCi/g.

5.2.2.3 Brass Cap Area. The Brass Cap Area is located in the center of TRA, near building TRA-630, and is southeast of site TRA-19 (see Figure 5-5). The contamination at this site is attributed to leaking warm waste lines. Following discovery of the contamination, the leaking waste line was repaired and contaminated soil associated with waste line repairs was removed. During removal of the contaminated soil, water collected in the bottom of the excavation. Actions included removing the soil and concrete in the area, identifying the leak, and repairing a pipeline elbow. The highest radiation levels were present directly above the elbow in the wasteline. Following the repair, the excavation was backfilled with clean soil and then resurfaced with concrete. The source of the water was determined to be a leaking warm waste line, located 5 ft (1.5 m) south and 5 to 6 ft (1.5 to 1.8 m) below the level of the excavation. The extent of migration of the radiological contamination under the concrete surface was characterized by boring six 8-inch-diameter holes through the concrete, followed by measurements using field screening instruments (intrinsic Germanium detector, multichannel analyzer, and tungsten collimator).

The extent of contamination in the excavation was determined by driving a hollow-pointed pipe into the ground at the bottom of the excavation and measuring the radiation inside the pipe. This survey indicated that the soil was contaminated to a depth of approximately 10 ft (3 m). Soil sample results from the excavation indicated that the radionuclide contaminants consist primarily of Cs-137 and Cs-134, with lesser amounts of Sr-90 and Co-60. Contaminant estimates at the Brass Cap Area are based on radiation measurements rather than direct soil sampling results. It is not known whether chemical contaminants exist at this site. Following the soil removal and leak repair, the excavation was backfilled with clean soil and resurfaced with new concrete. A brass marker (hence, the name Brass Cap Area) was placed in the concrete to designate the area of subsurface contamination.

5.2.3 Windblown Surficial Contamination Site

5.2.3.1 Sewage Leach Pond Berms and Soil Contamination Area. The soil contamination area (Figure 5-6) is a fence-enclosed radiation control area on the north and south sides of the Sewage Leach Pond. The fenced area is approximately 475 × 480 ft (145 × 147 m). Radiological contamination on the south side of the southern berm (Figure 5-7) is attributed to Warm Waste Pond sediments. However, radiological contamination on the north side of the southern berm may have resulted from windblown Sewage Leach Pond sediments and/or the Warm Waste Pond windblown sediments.

A sampling investigation was conducted in the summer of 1994 to characterize the radionuclide contamination in surface soil northeast and southwest of the Warm Waste Pond. Fifty samples were collected along transects, which included the area adjacent to the Sewage Leach Pond. The most frequently detected radionuclides were Cs-137, Co-60, and Sr-90. Interim action at Warm Waste Pond in 1993 included excavation and consolidation of the contaminated pond sediments, which were then covered with clean soil, thus eliminating the suspected source of the windblown surface soil contamination. During this interim action, a front-end loader was used to remove contaminated surface soil with instrument readings of over 100 counts per minute. No verification samples, however, were collected to confirm the effectiveness of this contamination removal activity at that time.

In 1995, additional sampling was conducted to characterize the surface soil contamination near the Sewage Leach Pond; this sampling confirmed a reduction in contamination. Surface soil samples were randomly collected from 18 locations on the southern berm and from 18 locations in the remainder of the soil contamination area. Cesium-137 was detected in all samples collected on the southern berm and is the COC that causes an unacceptable risk. Other isotopes detected in berm samples were Co-60, Ag-108m,

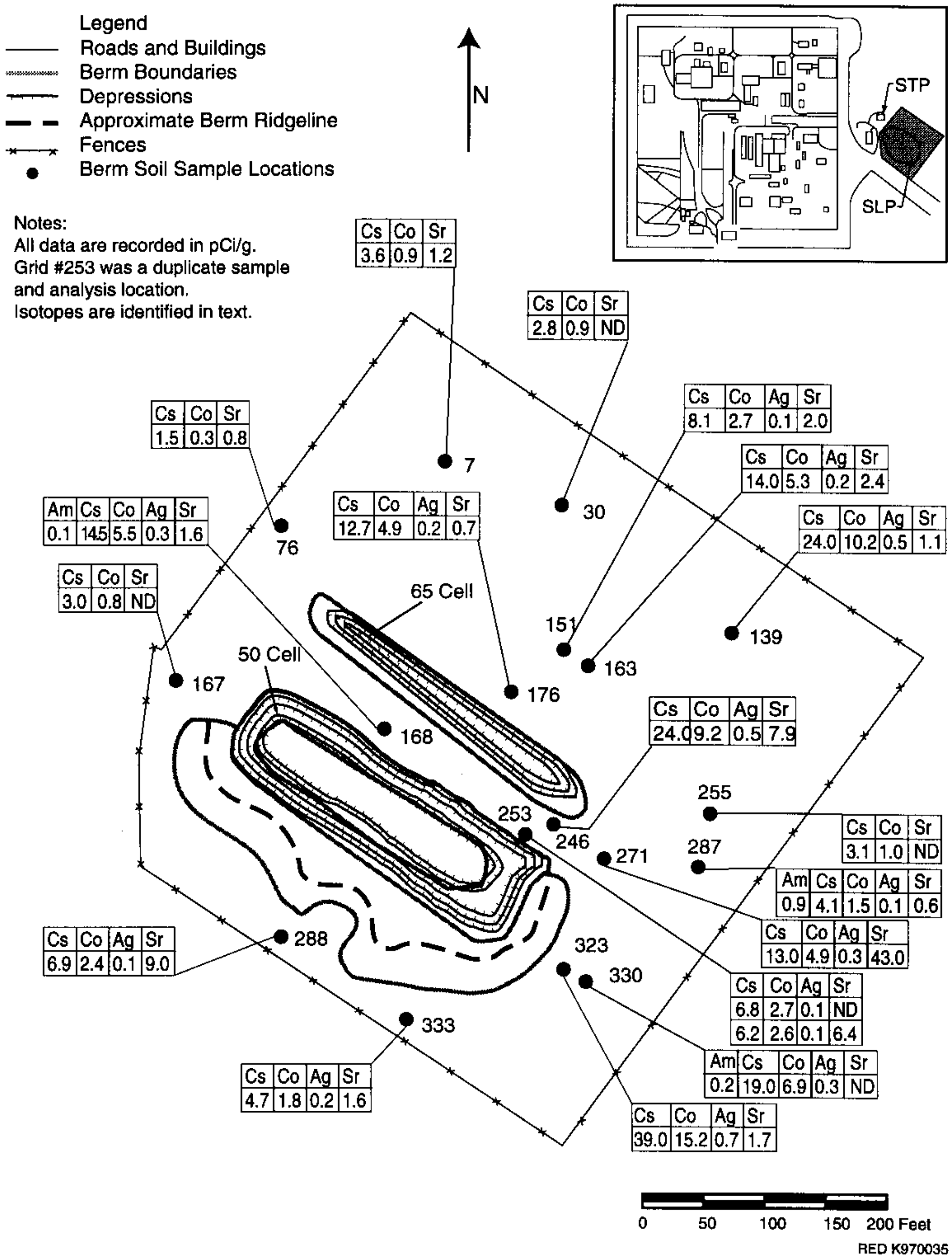


Figure 5-6. Sewage Leach Pond soil contamination area showing 1995 sampling locations and data.

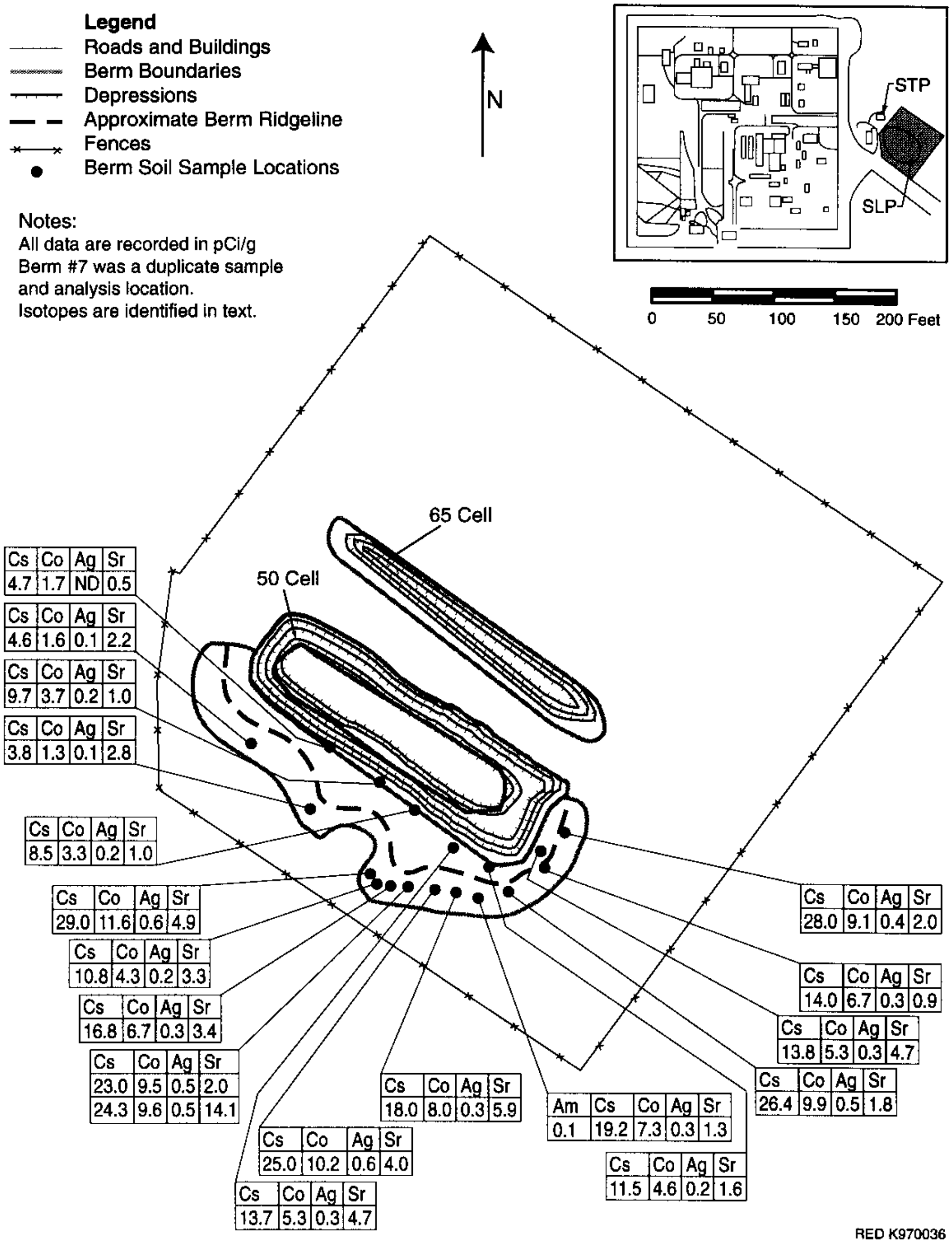


Figure 5-7. Sewage Leach Pond berms showing 1995 sampling locations and data.

and Am-241. Also detected were the metals silver, barium, beryllium, cadmium, chromium, copper, mercury, nickel, lead, and zinc. The SVOCs pyrene, fluoranthene, phthalates, chrysene, benzo(b)fluoranthene, and 4-chloroanaline were also present. All metals were detected at or below background concentrations. All SVOCs were nondetectable.

Samples from the remainder of the area had the same radionuclide contaminants, but at lower levels than found in the berm samples. The primary COCs are Co-60 and Cs-137. Levels of contamination, however, are below the preliminary remediation goal concentrations for radionuclides.

5.2.4 Snake River Plain Aquifer and Deep Perched Water System

Infiltration of water from the pond system at TRA has caused contaminant migration to the SRPA. A chromium plume with concentrations currently above maximum contaminant levels (100 μg/L) extends both south and southwest of TRA. A tritium-contaminated plume with concentrations currently above maximum contaminant level (MCLs) also exists, extending both south and southwest of TRA. Semiannual monitoring of these plumes continues. Computer modeling was conducted to determine the predicted contaminant levels in the future. Through radioactive decay (tritium), natural attenuation, and dispersion processes, contaminant levels in the SRPA are expected to be reduced to less than MCLs (100 μg/L) between the years 2004 and 2016. In order to evaluate the possibility of overlapping groundwater contaminant plumes with other areas, contaminant source terms from the TRA modeling effort are included in the OU 3-13 groundwater modeling effort at the Idaho Chemical Processing Plant.

The perched water zones underlying TRA are contaminated from infiltration of wastewaters from the system of ponds. An investigation of the two perched zones (shallow and deep) was conducted. The ROD for the TRA Perched Water System, OU 2-12, was issued in December 1992. It was determined in the ROD that no remedial action was necessary to ensure protection of human health and the environment. That decision was based on the results of human health and ecological risk assessments (ERAs), which determined that conditions at the site pose no unacceptable risks to human health or the environment for expected or future use of the SRPA beneath the deep perched water system at TRA. One of the assumptions for the no-remedial-action decision was that groundwater monitoring would be conducted to verify that contaminant concentration trends follow those predicted by a groundwater computer model. It was further stated that a statutory review of this decision would be conducted by the agencies within 3 years to ensure that adequate protection of human health and the environment continues to be provided.

A technical memorandum was prepared in August 1996 that presents the 3 years of post-ROD monitoring data and provides an evaluation of hydrologic and groundwater contaminant conditions for the TRA deep perched water system and the underlying aquifer (refer to Section 5.2.5.12 for more information regarding the results of the 3-year post-ROD monitoring). The agencies agree that the remedy selected for OU 2-12 continues to provide adequate protection of human health and the environment. Specific recommendations in the OU 2-12 3-year review include continued sampling at SRPA wells TRA-06 and TRA-08, replacement of positive displacement pumps in wells TRA-06 and -08 by submersible pumps, and sampling on a semiannual basis for both deep perched water system and SRPA wells. The SRPA wells will be sampled for total dissolved chromium and tritium semiannually and cadmium, Co-60, and Sr-90 annually; deep perched water system wells will be sampled for total dissolved chromium, tritium, cadmium, Co-60, and Sr-90 semiannually. The OU 2-12 ROD is a final ROD and stand-alone document.

A required monitoring plan will be developed following signature of this ROD. Monitoring performed in accordance with the OU 2-12 ROD will be integrated into the OU 2-13 post-ROD groundwater monitoring plan. The Warm Waste Pond and the Sewage Leach Pond have also been replaced by lined ponds, resulting in the elimination of a previous large source of contaminated effluent impacting the perched water zones. The impact of this source reduction will continue to be monitored.

5.2.5 No Action Sites

The agencies agree that no action will be taken under CERCLA at the sites discussed in the following sections. For those sites for which no action is being taken based on land use assumptions, those assumptions will be reviewed as part of the 5-year review.

5.2.5.1 Rubble Piles. Ten sites consisting of uncontaminated rubble piles were examined in the initial review of the TRA site. Because they contain no hazardous substances that would pose an unacceptable risk, they were given a No Action status in the FFA/CO and were not considered further in the RI/FS. Miscellaneous asbestos tiles were discovered and cleaned up from the rubble piles in 1996.

5.2.5.2 Paint Shop Ditch (OU 2-01). The Paint Shop Ditch is an open ditch that was used for disposal of paint-shop waste until 1982. The site has been characterized; concentrations of contaminants are below risk-based levels of concern. A determination of No Further Action for the site was approved by the agencies in December 1991.

5.2.5.3 Inactive Fuel Tank Sites (OU 2-02). This OU 2-02 site includes five underground storage tanks that contained petroleum products. All five of the tanks have been removed from the ground; the initial site characterizations found that either no, or minimal, contamination remained at the sites. The sites were all recommended and approved for No Further Action by the agencies in 1992 and 1993.

5.2.5.4 Miscellaneous (OU 2-03). This OU includes six miscellaneous sites where sources of contamination no longer exist. All sites in this OU received No Further Action determinations from the agencies in 1993. Following are summaries of those sites.

TRA-01 is a burial site containing excavated soil from a 1983 sulfuric acid spill. The acid in the soil was immediately neutralized at the spill site before excavation and burial. Bounding calculations show that the calcite content of the soil would be sufficient to neutralize more than 10 times the estimated release volume. As no source exists at the site, no further action is appropriate.

TRA-11 is a french drain connected to the overflow vent of a 1,000-gal (3,875-L) sulfuric acid tank. No documented overflows or evidence of spills is associated with the site. Risk-based calculations demonstrate that the threshold quantity of acid necessary to generate an unacceptable risk would have been appropriately documented. As no source likely exists at the site, no further action is appropriate.

TRA-12 is a site where, in 1983, an estimated 110 gal (416 L) of No. 5 fuel oil overflowed from a 200,000-gal (75,708-L) aboveground tank. Two independent eyewitnesses report that the flow never reached the ground (because of the high viscosity of the oil), and no ground staining was observed. Bounding calculations show that VOCs would not be present even if the spill volume was increased by a factor of ten. As no source exists at the site, no further action is appropriate.

TRA-20 is the site of a 15,000-gal (56,781-L) aboveground concrete tank used for processing sodium chloride solution, sodium hydroxide, and sulfuric acid. Before using the sodium hydroxide and sulfuric acid in the tank, it was lined with epoxy. The tank lining was found to be intact during a 1992 inspection. Bounding calculations show that the calcite present in 10 yd^3 of soil would be sufficient to neutralize at least 315 gal (1,192 L) of the acid. Risk-based calculations indicate that the threshold quantity of sulfuric acid [315 gal (1,192 L)] is greater than the amount likely to have been spilled. No further action is appropriate.

TRA-40 is the site of a 45-ft (13.7-m) concrete-lined trench containing piping for demineralizer solutions. A portion of the trench was unlined prior to 1989. Releases before 1984 would have involved nonhazardous substances. Subsequently, the system transferred sulfuric acid and sodium hydroxide. There are no documented releases from the site, and an inspection performed in 1992 indicated that the system was in a well maintained condition. Had a leak occurred, approximately equal volumes of acid and base would have been released. As no source exists at the site, no further action is appropriate.

TRA-614 is a site consisting of an earthen berm where small quantities of oil may have been disposed. There is no documentation or evidence of oil disposal at the site. The site is currently beneath Building TRA-628. With excavation of the berm, there is no known source. No further action is appropriate.

Based on these results, no further action is appropriate for all OU 2-03 sites.

5.2.5.5 Petroleum and PCB Spill Sites and North Storage Area, Including the Soil Contamination Area (OU 2-04). Sites recommended for No Further Action include seven sites of mainly petroleum products, including three with PCB-contaminated areas. The other four sites include diesel fuel contamination in a perched water well, contamination beneath an old loading dock, and two areas of fuel oil contamination. Also included in OU 2-04 is the North Storage Area, including the North Storage Area Soil Contamination Area where localized areas of radionuclide-contaminated soils exist. The agencies recommend no further action because potential concentration of contaminants and associated risks are below levels that would justify cleanup action or further investigation.

TRA-653 is the site of a PCB transformer spill. After excavation of 8 yd^3 of contaminated soil and backfilling with clean soil in 1990, the highest PCB concentration was found to be 16 ppm under 4 ft (1.2 m) of clean soil. The maximum surface concentration was 2 ppm located in a 2 × 8 ft (0.6 × 2.4 m) area that was not excavated. The use of a conservative computer screening model demonstrated that the concentration of PCB is below that necessary to pose a risk to groundwater. Although the concentration of PCB for the soil ingestion pathway is above the 1 in 1,000,000 concentration of 0.08 ppm for carcinogenic risk, it is below the 25 ppm cleanup level established under the Toxic Substances Control Act (TSCA) for restricted industrial areas. No further action is appropriate.

TRA-619 is the site of a PCB transformer spill. Approximately 10 to 12 yd^3 of soil were removed from around the transformer. The site was backfilled with approximately 2 ft (0.6 m) of clean soil. The highest PCB concentration of 22 ppm is below the 2 ft (0.6 m) of contaminated soil and the concrete pad, which was left in place. Although the concentration of PCB for the soil ingestion pathway is above the 1 in 1,000,000 concentration of 0.08 ppm for carcinogenic risk, it is well below the 25 ppm cleanup level established under TSCA for restricted industrial areas, and is under at least 2 ft (0.6 m) of clean soil. No further action is appropriate for this site. Note that this site description was inadvertently left out of the list of No Action site descriptions in the Proposed Plan.

TRA-626 is the site of a PCB transformer spill. Approximately 36 yd^3 of soil and concrete were excavated from the site, followed by backfilling with clean soil. The highest PCB concentration is 24 ppm under 4 ft (1.2 m) of clean soil. Computer model results demonstrate that the concentration of PCB is below that necessary to pose a risk to groundwater. Although the concentration of PCB for the soil ingestion pathway is above the 1 in 1,000,000 concentration of 0.08 ppm for carcinogenic risk, it is below the 25 ppm cleanup level established under TSCA for restricted industrial areas, and is under 4 ft (1.2 m) of clean soil. No further action is appropriate.

PW-13 is a monitoring well site where diesel fuel was discovered at a depth of 65 to 75 ft (20 to 23 m) during drilling operations. After removing approximately 20 gal (76 L) of diesel fuel, the borehole was observed for several days without additional influx of fuel being noted. The well was subsequently completed at a depth of 90 ft (27 m). The well has been sampled four times (July 1993, October 1993, January 1994, and April 1994) and analyzed for total petroleum hydrocarbons. The well was sampled and analyzed twice for benzene, toluene, ethylbenzene, and xylene. All analyses were reported as nondetects, with the exception of ethylbenzene, which was detected in samples at concentrations ranging from nondetect (April 1994) to a high of 5.41 ppb (July 1993). These levels are well below the allowable drinking water MCL of 700 ppb.

TRA-09 is the site of a former loading dock used to store petroleum products and solvents where, as a result of transfer operations, small quantities of this material may have been spilled. Bounding calculations performed demonstrated that the hazardous constituents from small incidental spills would have volatilized in the 8 years since the dock was removed. Soil staining observed in 1985 when the dock was removed is no longer visible, qualitatively indicating natural degradation of the spill constituents.

TRA-670 is the site of surficial oil staining at the former location of two 500-gal (1,893-L) aboveground waste oil storage tanks. Anecdotal information indicates that the tanks had been overfilled on at least one occasion and that small incidental spills would occur during routine transfer operations. The tanks and stained soil were removed from the site in 1987, and the area was backfilled with clean soil. It is unlikely that sufficient contamination remains at this location to pose an unacceptable risk.

TRA-627 is the site of oil-stained soils at an oil transfer pump house. The pump house was used to transfer No. 5 fuel oil from trucks to storage tanks. Incidental spills occurred during the transfer as lines were connected and disconnected. Whenever these spills occurred, however, it was standard practice to use a sand absorbent on the spill. The sand was then put into a "sand box" before disposal at the Central Facilities Area landfill. The only hazardous constituents of No. 5 fuel oil are low levels of polycyclic aromatic hydrocarbons. The high viscosity of No. 5 fuel oil would have prevented significant infiltration prior to removal of the spills.

The North Storage Area, including North Storage Area Soil Contamination Area located north of the North Storage Area fence, contained localized radionuclide-contaminated soil. This soil contamination area was removed in the summers of 1995 and 1996 as part of an INEEL-wide cleanup of radioactively contaminated surface soil. Confirmation samples show that removal of this contamination was effective. No further cleanup action is necessary, and the No Action option is appropriate.

5.2.5.6 Hot Waste Tanks (OU 2-05). This OU contains two tank sites (TRA-16 and TRA-603/605) used for hot waste disposal. Site TRA-16 was an underground hot waste storage tank. The contents of the tank were sampled in April 1993 and found to be an ignitable waste contaminated with low levels of radionuclides, primarily uranium isotopes. The tank contents were removed, and the tank was excavated in August 1993. Note that no leaks were detected and the tank was intact upon inspection when it was removed. The risk evaluation of the site found no unacceptable risk from exposure through any complete pathway. At the TRA 603/605 tank, there had been no evidence of leaks. It is unlikely that a source of contamination remains at the site. The process water pipe loop is constructed of 0.25-in. (0.64-cm) stainless steel and is unlikely to have lost sufficient integrity to allow leakage. In addition, any leaks would be collected in a sump within the building where the portion of the loop being used for storage is located. There have been no reports of leaks. It is unlikely that there is a source of contamination at this site. The agencies concurred in 1994 that no further action is necessary for these two tank sites.

5.2.5.7 Rubble Sites (OU 2-06). This OU 2-06 site consists of three separate rubble piles, which were generated as a result of previous construction activities at the TRA. These piles are located outside the existing fenced perimeter and were used intermittently from 1952 through 1971. No source of hazardous waste contamination exists at any of the three sites; therefore, no complete pathways were identified. After a limited investigation, the agencies concurred in October 1993 that no further action is necessary at these three sites. Historical data, including photographs, information from operations personnel, and field screening data obtained during site visits provided the basis for this evaluation.

5.2.5.8 Cooling Tower Sites (OU 2-07). This OU consists of areas surrounding the cooling tower basins and cooling towers associated with the ETR, MTR, and ATR. The sites were suspected of being contaminated with hexavalent chromium. However, the majority of chromium detected in the soil had been reduced to the less toxic trivalent state and is in the elemental state. Risk evaluations conducted for current occupational and future residential scenarios indicated that the potential risk for all pathways and all scenarios does not exceed 1 chance in 1,000,000. Based on these results, DOE-ID recommended, and the EPA and IDHW concurred, that no further action is appropriate.

5.2.5.9 Materials Test Reactor Canal (OU 2-08). For approximately 8 years, the canal, installed in 1952, leaked significant quantities of water contaminated with radionuclides. During an investigation in 1994, historical data (including operating procedures), monitoring data, and information from site personnel were collected and evaluated. Potential contaminants in the subsurface are available for release only to the groundwater pathway, as the base of the canal is 14 to 32 ft (4 to 10 m) below ground level.

The groundwater pathway was evaluated using a conservative computer screening model. The results of the modeling indicate that the COCs (cadmium, beryllium, cesium, and cobalt) are relatively immobile, based on their respective computed travel times to the underlying aquifer. In addition, the potential for contaminant migration from moisture infiltration is limited by the fact that the major portion of the canal is located below the MTR building and the portion that extends beyond the building is under pavement. Based on this information, the risk to human health and the environment to exposure by contaminants in the canal is considered low. DOE-ID recommended, and EPA and IDHW concurred, that no further action is appropriate for this site.

5.2.5.10 Sewage Treatment Plant (OU 2-09). Because there is no evidence of a release of a hazardous material, this site was determined to require no further action.

5.2.5.11 Retention Basin, Injection Well, Cold Waste Sump and Pit (OU 2-11). The warm waste retention basin is a large underground concrete basin. The retention basin received the waste routed to the Warm Waste Pond. It was originally designed to hold radioactive wastewater long enough for short-lived radionuclides to decay. The disposal well sampling pit, and sump system located south of the retention basin, were used for the disposal of uncontaminated cooling tower effluent water between 1964 and 1982. The site was evaluated in 1992, and it was determined that the well (TRA-05) sump and sampling pit do not pose an unacceptable risk. Radiological and chemical soil contamination was identified surrounding the warm waste retention basin from releases associated with the basin, piping, and sumps. The results of the OU 2-13 comprehensive baseline risk assessment indicate that the risks associated with the site are within allowable levels. The recommendation from the agencies for these sites is that no further action is appropriate.

5.2.5.12 Perched Water (OU 2-12). This OU comprises the perched water zones underlying the TRA. These zones are a result of water from the Cold Waste Pond, Warm Waste Pond, Chemical Waste Pond, and Sewage Leach Pond infiltrating the ground and perching on low permeability layers (i.e., silts and clays) in the underlying basalt. The investigation of the shallow and deep perched water zones was completed in 1992, and a ROD was signed in December 1992, recommending long-term monitoring and evaluation of monitoring results. After 3 years of post-ROD monitoring, chromium and tritium concentrations in two of the SRPA monitoring wells remain above drinking water standards. However, insufficient data have been collected to determine the statistical significance of these results. Overall, good agreement between actual and expected concentrations for other contaminants exists on the basis of the 3 years of study since the OU 2-12 ROD was signed. The Deep Perched Water System wells show that removing the Warm Waste Pond from service has reduced contaminant concentrations with time. In general, all monitoring wells show a decreasing contaminant concentration trend, with the exception of one well with chromium (USGS-53) and one well with tritium (USGS-58) that shows an increasing trend with time. The extent of detectable contaminant plumes originating at TRA appears to be less than 5 km, based on United States Geological Survey (USGS) monitoring of the public rest stop well on U.S. Highway 20. Continued monitoring of the SRPA and the perched water below the TRA is recommended.

5.2.5.13 New Sites (OU 2-13). **Hot Tree Site**—The Hot Tree Site is located in the center of TRA. Screening of the branches of a spruce tree indicated it was contaminated with gamma-emitting radionuclides. The tree was removed, boxed, and disposed in May 1994. Subsequent to the removal of the tree, ten shallow soil boring samples were collected for field screening. The samples were collected approximately 2 ft (0.6 m) below land surface in the immediate area surrounding the former tree location, and the tree's root system was surveyed. In addition, three surface soil samples were collected and submitted for analysis. The highest radiologically contaminated areas were located west of the Hot Tree Site, suggesting that a nearby abandoned warm waste line was the contamination source. Adjacent trees were surface screened in August 1994. The surface screening of adjacent trees did not indicate contamination. Surface radiation surveys of the Hot Tree Site indicated a radiation dose rate of 30 to 40 μrem/hr at waist height (i.e., TRA background levels). This suggests that the contamination was confined to the Hot Tree Site.

The warm waste line, which is the suspected contamination source, is located approximately 10 ft (3 m) west and 6 ft (1.8 m) below land surface of the removed tree. The waste transferred through this line was low-pressure, demineralized acidic water. The acidic condition of the waste could have contributed to the deterioration of the line, which could lead to potential releases. The line was cut and capped in 1983, so it is not suspected to be a potential source of continuing releases.

Because only Cs-137 was detected in two 1994 surface soil samples, it is the only COPC. Based on the Hot Tree Site, sampling information by TRA facility personnel, and process knowledge of the warm waste line, only gamma-emitting radionuclides Cs-137 and Co-60, and the beta-emitting radionuclide Sr-90, were identified as COPCs at the Hot Tree Site.

Additional sampling was conducted to better characterize the subsurface contamination profile. The results of this sampling effort were evaluated in the baseline risk assessment. The baseline risk assessment showed that an unacceptable risk does not exist at this site because of low contaminant concentrations in the soil. No further action is necessary for this site.

Engineering Test Reactor Stack—The Engineering Test Reactor Stack is located outside and east of the TRA perimeter fence and west of the Warm Waste Pond. The site was suspected to have PCB contamination because tar-containing PCBs were used to coat the inside of the stack. This tar coating had deteriorated since 1957, when the stack was put in operation, and started to leak out the north access door at the base of the stack. Because of this process knowledge, no other COPCs are associated with this site. In addition, samples collected by the facility indicated low levels of PCBs in the soil immediately adjacent to the concrete pad where the stack was located.

Three soil/concrete samples and one duplicate were collected from the soil at the base of the stack. Analysis of the samples indicates that very low levels of PCB contamination are present at this site. The maximum concentration was 2.3 ppm of the Aroclor-1260 PCB in one sample. The TSCA requires cleanup of PCB-contaminated soils at an industrial site if the PCB concentration is 25 ppm or higher. Because the maximum concentration detected was 2.3 ppm, cleanup is not required. No further action is necessary.

French Drain Associated with TRA-653 (TRA-41)—The French Drain is located in the south central portion of TRA. The French Drain comprises an 8-in. (20-cm) conduit extending from ground surface to approximately 2 ft (0.6 m) below land surface. This French Drain is still in place and operational. It is reported to the State of Idaho on the active injection well inventory. Process knowledge indicates that VOCs and SVOCs are the only COCs. Sampling was conducted at the French Drain in August 1993 during a Site-wide assessment of shallow injection wells. The material sampled was a sludge with a black tar-like appearance. The analytical data indicated that this new site had probably been contaminated by the TRA-653 mechanical shop operations. The wastes suspected are solvents, fuel residues, and oily wastes. The composite sample result was sufficient to characterize the sludge material.

A TRA facility maintenance action was completed in 1995 to remove sludge inside the drain. Approximately two 55-gal (208-L) drums of material were removed from the drain during the maintenance action. Confirmation sampling was conducted following removal of the sludge to verify total contamination removal. This material was characterized in August 1995 and was determined to be nonhazardous. Following this determination, the drums were dispositioned at the Central Facilities Area landfill. The results of the baseline risk assessment indicate that an unacceptable risk is not posed by this site. No further action is recommended.

Diesel Unloading Pit (TRA-42)—The diesel unloading pit is located in the northeast corner of the Test Reactor Area. The unloading pit for No. 2 diesel consists of a 4-in. (10-cm) flow line encased in an approximately 3- × 3- × 8-ft (1- × 1- × 2.4-m) concrete vault. The connection has been used since the late 1950s. Over the years, the unloading operations have resulted in minor releases into the bottom of the pit.

When the pit was cleaned, it was discovered that the pit had an unlined soil and sand floor, not a concrete floor as expected. Any diesel spills may have penetrated the surface soil of the pit surrounding the connection.

No additional field characterization was conducted. A conservative estimate of the volume of diesel fuel that may have been spilled at the site indicates that the volume is insufficient to migrate to groundwater using the computer model. In addition, the computer model indicated that the potential residual concentration of benzene that might be leached into the groundwater is insufficient to pose a risk for groundwater consumption. This site was eliminated from further evaluation on the basis that a source of contamination is no longer present that would pose an unacceptable risk. No further action is necessary.